National Park Service
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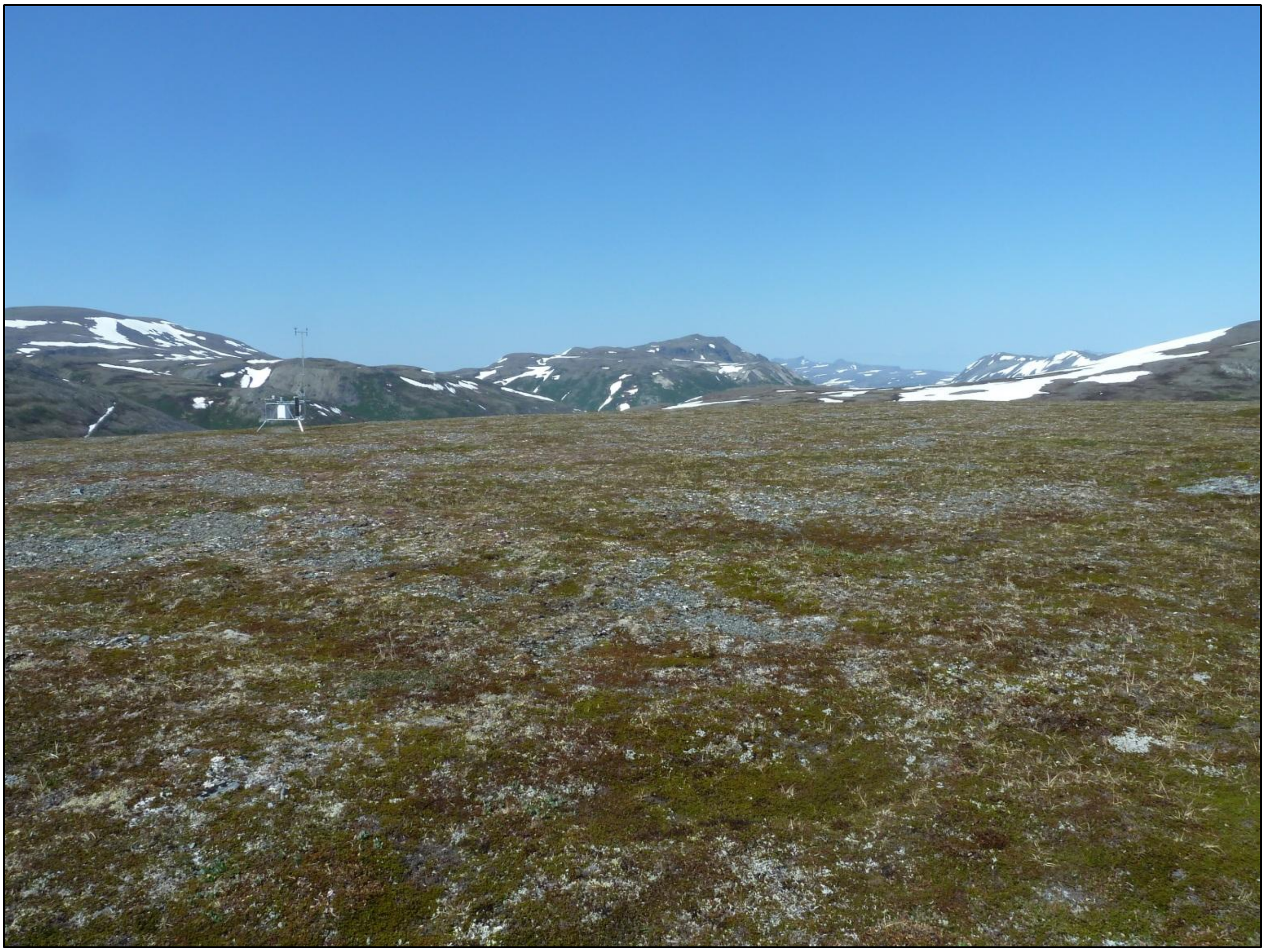
Natural Resource Stewardship and Science

# Climate Monitoring in the Southwest Alaska Network

*Annual Report for the 2012 Hydrologic Year*

Natural Resource Technical Report NPS/SWAN/NRTR—2013/716



**ON THE COVER**
Remote Automated Weather Station at the Pfaff Mine site located northeast of Kulik Lake, Katmai National Park and Preserve
Photograph by: Chuck Lindsay

# Climate Monitoring in the Southwest Alaska Network

*Annual Report for the 2012 Hydrologic Year*

Natural Resource Technical Report NPS/SWAN/NRTR—2013/716

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U.S. Department of the Interior
National Park Service
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Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols. This report also received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data.



This report is available from the Southwest Alaska Network Inventory and Monitoring Program website (http://science.nature.nps.gov/im/units/swan/) and the Natural Resource Publications Management website (http://www.nature.nps.gov/publications/nrpm/).

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# Abstract

The Southwest Alaska Network Inventory and Monitoring program monitors climate across a region that includes five national park units: Alagnak Wild River, Aniakchak National Monument and Preserve, Katmai National Park and Preserve, Kenai Fjords National Park, and Lake Clark National Park and Preserve. To date, monitoring efforts have focused on the placement and installation of new weather stations and the development, testing, and implementation of a protocol for monitoring climate. In addition to operating and maintaining 10 weather stations in three network parks, weather observations are obtained from an additional 29 stations across the region of interest. This report summarizes weather observations from the recent hydrologic year and provides a regional and historical climatic context.

The Southwest Alaska Network region was colder than average and received average to above average precipitation during the 2012 hydrologic year (October 2011 through September 2012). Compared to the climatological normal (the prevailing set of weather conditions calculated over a 30-year period, currently 1981-2010), mean annual temperatures for six long-term weather stations were 2.7 to 4.0 °F below average. Total annual precipitation was 108 to 142 % of average. In general, locations in the southern part of the region received above average precipitation whereas locations in the northern part of the region received closer to average precipitation. Several fall and winter months (November, January, and March) and also summer months (May through September) were colder than average across the region. Several historical precipitation records were broken in February and September and record setting snowfall was observed in some locations. When compared to the period of record, temperature and precipitation during the 2012 hydrologic year are generally consistent with colder than average conditions observed during the 2006-2009 and 2011 hydrologic years, but represent a departure from the drier than average conditions generally observed during recent years. Negative (cool phase) Pacific Decadal Oscillation conditions and a La Niña (cool phase) event of the El Niño-Southern Oscillation occurred during the 2012 hydrologic year.

All ten weather stations that are operated by the Southwest Alaska Network were maintained during the 2012 hydrologic year. Staff from the National Oceanic and Atmospheric Administration and the Southwest Alaska Network completed installation of a new U.S. Climate Reference Network station at Contact Creek in Katmai National Park and Preserve – 42 miles southeast of King Salmon. This station joins a network of over 114 stations developed, deployed, managed, and maintained by the National Oceanic and Atmospheric Administration for the express purpose of detecting the national signal of climate change. The vision of this program is to maintain a sustainable high-quality climate observation network that 50 years from now can with the highest degree of confidence answer the question: *How has the climate of the nation changed over the past 50 years?*

## Acknowledgments

The author thanks the dedicated park staff and volunteers who faithfully document weather and snowpack observations throughout the year. The author credits Nat Wilson and Regan Sarwas for their work developing the data processing routines and Bruce Giffen for his dedication to developing the climate monitoring program in Southwest Alaska Network parks. Thoughtful reviews by Bruce Giffen, Ken Hill, Michael Shephard, and Tammy Wilson improved an earlier version of this report.

# Acronyms

| | |
|---|---|
| **ACRC** | Alaska Climate Research Center |
| **ALAG** | Alagnak Wild River |
| **ANIA** | Aniakchak National Monument and Preserve |
| **ASOS** | Automated Surface Observing System |
| **AWOS** | Automated Weather Observing System |
| **BLM** | Bureau of Land Management |
| **BUOY** | Moored Buoy (NOMAD) |
| **CMAN** | Coastal Marine Automated Network |
| **COOP** | Cooperative Observing Program |
| **CRN** | Climate Reference Network |
| **ENSO** | El Niño-Southern Oscillation |
| **FAA** | Federal Aviation Administration |
| **GOES** | Geostationary Operational Environmental Satellites |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **KATM** | Katmai National Park and Preserve |
| **KEFJ** | Kenai Fjords National Park |
| **LACL** | Lake Clark National Park and Preserve |
| **NCDC** | National Climatic Data Center |
| **NDBC** | National Data Buoy Center |
| **NESDIS** | National Environmental Satellite, Data, and Information Service |
| **NIFC** | National Interagency Fire Center |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **NOMAD** | Navy Oceanographic Meteorological Automated Device |
| **NPS** | National Park Service |
| **NRCS** | Natural Resources Conservation Service |
| **NWS** | National Weather Service |
| **P** | Precipitation |
| **PDO** | Pacific Decadal Oscillation |
| **RAWS** | Remote Automated Weather Station |
| **SNOTEL** | Snowpack Telemetry |
| **SST** | Sea Surface Temperature |
| **SWAN** | Southwest Alaska Network |
| **T** | Temperature |
| **USFS** | United States Forest Service |
| **WBAN** | Weather Bureau Army Navy |
| **WRCC** | Western Regional Climate Center |

# Introduction

This report is the fourth in an annual series detailing the climate of the Southwest Alaska Network (SWAN). The purpose of these annual reports is to summarize observations from local weather stations for the previous hydrologic year and to provide regional and historical contexts for these observations.

## Climate Overview

The SWAN consists of five National Park Service units: Alagnak Wild River (ALAG), Aniakchak National Monument and Preserve (ANIA), Katmai National Park and Preserve (KATM), Kenai Fjords National Park (KEFJ), and Lake Clark National Park and Preserve (LACL). The climate of this region is largely influenced by the region's high latitude, proximity to oceans, complex topography, and interaction of those features with global atmospheric circulation (Simpson et al. 2002). The park units in the SWAN are aligned along the northern Gulf of Alaska and the maritime subarctic climate of the eastern, coastal areas of KATM, KEFJ, and LACL is characterized by moderate temperatures and abundant precipitation (Figure 1). Moist air masses are intercepted by the Kenai Mountains, the Aleutian and Alaska Ranges and heavy precipitation falls on their windward (east) sides. The western, more interior region of LACL is generally protected from maritime influence by large mountain ranges. The boreal climate here is more continental in nature and is characterized by a large annual range in temperature and small annual range in precipitation. The climate of the park units on the Alaska Peninsula (ALAG, ANIA, and KATM) is transitional between polar (tundra climate) and maritime (maritime subarctic) (Nowacki et al. 2001). In this region summer temperatures are moderated by the open waters of the Bering Sea (Bristol Bay), but winter temperatures are colder and more polar in nature due to the presence of sea ice in the coldest months. A more detailed discussion of the climate of the SWAN, including maps showing spatial and temporal patterns of temperature and precipitation, is provided by Redmond et al. (2005) and Davey et al. (2007).

**Figure 1.** Coastal regions of SWAN park units, like Kenai Fjords National Park, are characterized by moderate temperatures and abundant precipitation. In some locations the seasonal snowpack can persist into August, even near sea level.

### *Climate vs. Weather*

Although the terms climate and weather are sometimes used interchangeably, they differ in temporal perspective. Weather refers to the condition of the atmosphere at a specific point in time or during a short-lived atmospheric event. Climate refers to the aggregation of weather conditions for a location or region and can be defined with averages or representative values for weather elements.

### *Average, Normal, and Period of Record*

*Average* conditions refer to the prevailing set of climatic conditions based on the most recent 30 year reference period, which is currently 1981-2010. This 30 year reference period is referred to as the climatic *normal*. The *period of record* refers to the prevailing set of climatic conditions during the entire history of observations at a particular weather station. *Average* (i.e. *normal*) and *period of record* values for a specific weather station may differ significantly. It should be noted that this year marks the second for which the new 30 year reference period (1981-2010) will be used for comparison. Climatological comparisons to the “new” normal (1981-2010) conditions will differ slightly from those to the “old” normal (1971-2000) conditions. The 30 year climatic normal is used exclusively for comparison in the Results section. The period of record is used exclusively as a basis for historical context in the Discussion section.

### *Intrinsic Climate Variation*

Fall and winter atmospheric circulation over the North Pacific Ocean is dominated by the Aleutian Low, which is important to the climatology of SWAN parks. Low pressure systems moving from west to east along the subpolar front usually reach maximum intensity in the area of the Aleutian Low, a semi-permanent low pressure center. Winter storm tracks generally follow the Aleutian Islands and move into the Gulf of Alaska with a frequency of about four to five storms a month where they affect SWAN parks with precipitation and strong winds. The Aleutian Low weakens in the summer season and summer storm tracks generally follow the Aleutian Islands and then turn northward into the eastern Bering Sea with a frequency of three to four storms per month (Simpson et al. 2002). The seasonal variability in the location and intensity of the Aleutian Low and associated storm tracks explains much of the seasonal variability in climate patterns and differences in the timing of maximum precipitation in SWAN parks (Bennett et al. 2006).

Annual to decadal climate variability in the SWAN is primarily influenced by large-scale changes in atmospheric and oceanic circulation, such as the El Niño Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO). The ENSO affects the strength and positioning of the Jet Stream and the PDO affects North Pacific sea level pressure and sea surface temperature. Although not completely understood, both climatic oscillations are recognized to have important climatic consequences to coastal Alaska, including the SWAN.

ENSO events are recognized to influence temperatures by ±2-4 °F at a large spatial scale (Simpson et al. 2002, Papineau 2005). While the average El Niño event results in a modest increase in winter and summer temperatures across Alaska, the effect is both spatially and temporally (from one El Niño event to another) variable. The average La Niña event results in cooler than normal temperatures and drier conditions in both winter and summer.

An abrupt positive shift in mean annual temperatures during 1976-1977 is widely recognized and is well correlated with the shift from the negative to positive phase of the PDO (Simpson et al. 2002, Hartman and Wendler 2005). Although not as pronounced as the shift in temperature, a corresponding increase in winter precipitation has been observed north of 57°N, primarily affecting coastal areas (Papineau n.d.). The PDO also influences winter time storm tracks, diverting them northward into the Cook Inlet area (Simpson et al. 2002).

***Climate Change***

The International Panel on Climate Change (IPCC) Fourth Assessment Report summarized the evidence that the global climate is changing rapidly and that rates of change are dramatically accelerated at northern latitudes (IPCC 2007). Alaska has warmed substantially over the 20$^{th}$ century, annual precipitation has increased (Weller et al. 1999), and the growing season has lengthened (Keyser et al. 2000). Temperature data from two long-term climate stations in the SWAN region show a significant increase in both mean wintertime and mean annual temperatures for 1949-2011 (Alaska Climate Research Center, 2011). Mean winter temperatures at King Salmon have increased by 8.0 °F and mean annual temperatures have increased by 3.4 °F. Mean winter temperatures at Homer have increased by 5.4 °F and mean annual temperatures have increased by 3.4 °F. It is important to note that these temperature trends span the 1976-1977 Pacific Climate Shift (Hartman and Wendler 2005), however, the observed warming trend is supported by independent observations of sea ice, glaciers, permafrost, vegetation, and snow cover. Climate projections derived from five General Circulation Models based on an intermediate climate change scenario (IPCC-A1B) suggest that average annual temperatures for SWAN parks will increase by 0.9-1.1 °F per decade (Scenarios Network for Alaska Planning 2008). Precipitation is also generally projected to increase with 11-26% more snowfall in winter and 10-12% more rain in summer.

## Other Resources

Additional climate-related information for the SWAN and surrounding areas include:

- Alaska Center for Climate Assessment & Policy (http://www.uaf.edu/accap/)
- Alaska Climate Research Center (http://climate.gi.alaska.edu/)
- Alaska Ocean Observing System (http://www.aoos.org/)
- Alaska Snow Water and Climate Services (http://ambcs.org/)
- Alaska State Climate Center (http://climate.uaa.alaska.edu/)
- National Climatic Data Center (http://www.ncdc.noaa.gov/oa/)
- NOAA Climate Services (http://www.climate.gov)
- National Data Buoy Center (http://ndbc.noaa.gov)
- National Weather Service – Alaska Region (http://www.arh.noaa.gov/)
- Pacific River Forecast Center (http://aprfc.arh.noaa.gov/)
- Western Regional Climate Center (http://www.wrcc.dri.edu/)

# Methods

## Stations

Few weather stations in the SWAN region have long-term reliable records. A complete inventory of land-based weather stations in the SWAN was completed by Davey and others (2007). Climate conditions have been monitored at a few locations near SWAN park units since the late 1930s and 1940s (one station record extends discontinuously to 1908). This report includes climate data from 39 stations operated by six different climate monitoring programs that are currently monitored by the SWAN (Figure 2). General descriptions of those climate monitoring programs are provided in Table 1 and station metadata are documented in Table 2. Collectively, those programs provide consistent monitoring of weather conditions and in some cases, provide a long-term climate record. However, the stations used for analysis in this summary report are the six weather stations with the longest, most complete records located near three SWAN parks.

## Data Acquisition, Quality Control, and Data Processing

Six different climate monitoring programs, described in Table 1, maintain official repositories for climate data monitored by the SWAN. Acquisition of climate data and data processing details are provided in the Methods for Monitoring Climate in SWAN Parks (Lindsay et al. 2012). In short, Remote Automated Weather Station (RAWS) data are obtained from the Western Regional Climate Center (WRCC). Data for National Oceanic and Atmospheric (NOAA) National Weather Service Cooperative Observing Program (COOP), Automated Surface Observing System (ASOS), Automated Weather Observing System (AWOS), and Climate Reference Network (CRN) stations are obtained from the NOAA National Climatic Data Center (NCDC). Snow Course and Snowpack Telemetry (SNOTEL) data are obtained from the National Resources Conservation Service (NRCS). Coastal-Marine Automated Network (CMAN) and moored buoy data (BUOY) data are obtained from the NOAA National Data Buoy Center (NDBC). Data from ancillary stations (e.g. seasonal ranger stations, temporary field data loggers) are not included in this report.

Data quality control procedures are provided by external agencies that manage the six different climate monitoring programs. Data-quality flags indicate missing or suspect data and the use of estimation procedures. RAWS data are subjected to additional data quality control measures that use range checking that follows MesoWest, or more conservative, specifications (Lindsay et al. 2012*)*. After acquisition, climate data (excluding Snow Course data) are processed using routines that convert data to standardized formats in both metric and U.S. customary units. Climate variables are summarized to daily and monthly measures. Maximum, minimum, and arithmetic means are derived for temperature. Arithmetic means are derived for relative humidity and snow depth. Cumulative values are calculated for precipitation and solar radiation. Scalar and unit vector averaging are used to derive average wind speed and wind direction, respectively. Missing, suspect, or otherwise flagged data are not used for summary purposes. For all derived measures, the percentage of valid observations is reported as a measure of the reliability of the derived mean and cumulative values. Monthly measures should not be considered representative of actual climatic conditions if more than 10% (three days) of observations are missing or suspect. Yearly measures should not be considered representative if more than 17% (five days) are missing from any month.

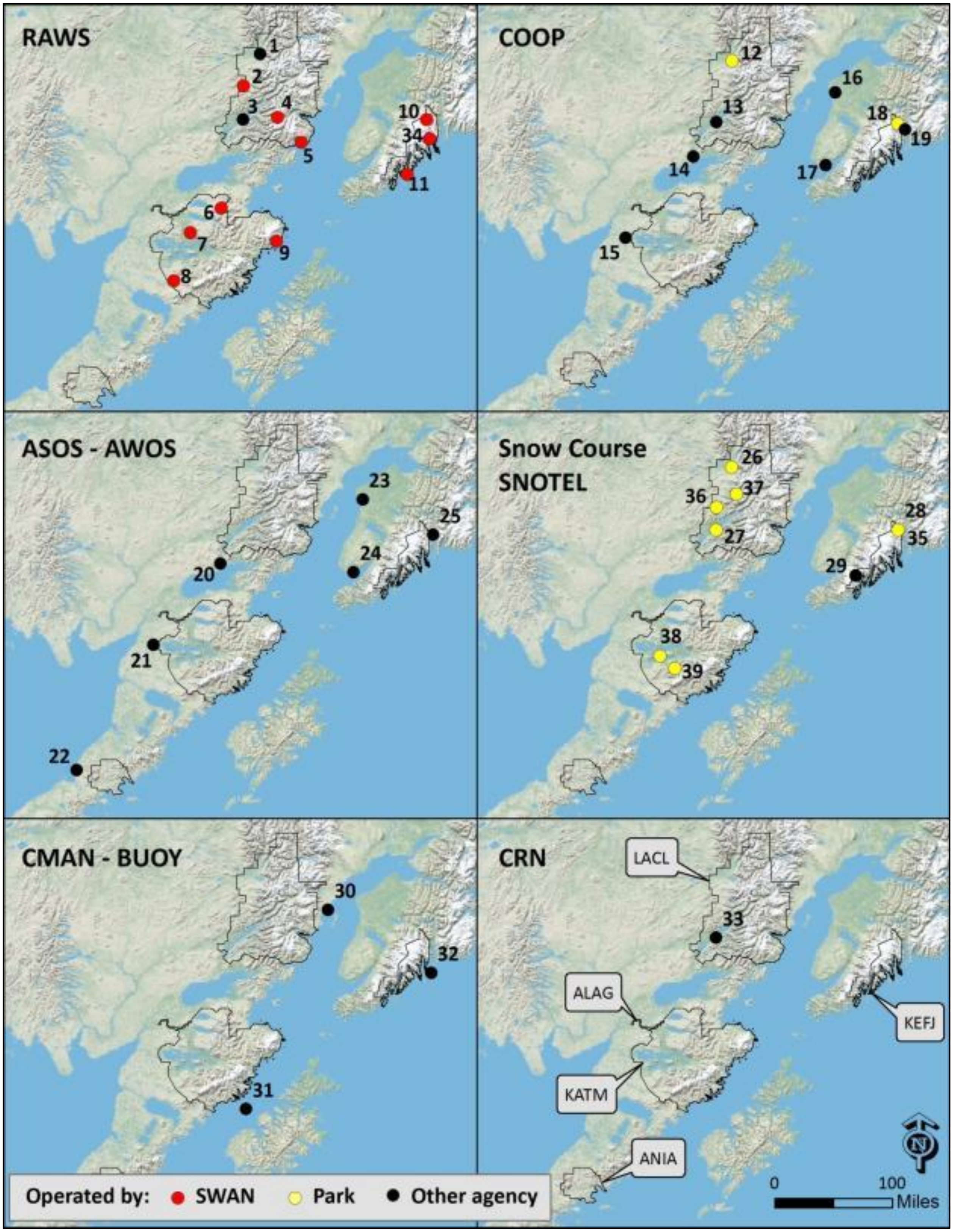


**Figure 2.** Locations of weather stations included in this report. Station acronyms, identifying numbers, and park acronyms are described in Table 1, Table 2, and the introduction section, respectively.

**Table 1.** Climate monitoring programs used within SWAN.

| Climate monitoring program (Acronym in bold) | Responsible agency | Program synopsis |
|---|---|---|
| ***RAWS*** *(Remote Automated Weather Stations)* | National Interagency Fire Center (NIFC), NPS, BLM, USFS, etc. | Interagency network of weather stations mostly used by fire-personnel to estimate a fire-danger rating in support of preventative measures, and to forecast the behavior of wildland fires. Automated sensors record hourly air temperature, relative humidity, precipitation, wind speed and direction, solar radiation, and snow depth. |
| **COOP** (National Weather Service Cooperative Observing Program) | National Oceanic and Atmospheric Administration (NOAA)-National Weather Service (NWS) | Observer-based program created in 1890 to define the climate of the United States and help measure extreme weather events, climate variability, and long-term climatic changes. Manual observations include daily maximum and minimum air temperature, precipitation, and snowfall. |
| **ASOS** (Automated Surface Observing System);<br><br>**AWOS** (Automated Weather Observing System) | NOAA-NWS, Federal Aviation Administration (FAA) | Weather stations installed at airports and military bases mostly used to support aviation needs and weather forecasting. Automated sensors record sub-hourly air temperature, relative humidity, precipitation, wind speed and direction, barometric pressure and other elements. |
| ***SNCO*** *(Snow Course);*<br><br>***SNOTEL*** *(SNOwpack TELemetry)* | National Resources Conservation Service (NRCS) | Observer-based program that manually measures snow depth and snow-water equivalent along permanent transects;<br>Automated stations that provide hourly measurements of air temperature, precipitation, snow depth, snow-water equivalent and other elements. |
| **CMAN** (Coastal-Marine Automated Network);<br><br>Moored **BUOY** (Navy Oceanographic Meteorological Automated Device or NOMAD) | NOAA-National Data Bouy Center (NDBC) | Weather stations installed at lighthouses, capes, beaches, nearshore islands, and offshore platforms. Automated sensors record hourly air temperature, wind speed, gust, and direction, barometric pressure. Some stations also measure sea water temperature, and wave direction and intensity.<br>Moored buoys equipped with automated sensors that record hourly air temperature, wind speed and direction, barometric pressure and other elements. |
| ***CRN*** *(Climate Reference Network)* | NOAA-National Climatic Data Center, NOAA-Atmospheric Turbulence and Diffusion Division | Network of weather stations being developed to provide long-term observations of temperature and precipitation that can be coupled to long-term, historical observations for the detection and attribution of present and future climate change. Automated sensors record hourly air temperature and precipitation. Other elements include ground surface temperature, solar radiation, and wind speed. |

**Table 2.** Weather stations included in this report. Map numbers identify locations in Figure 2. ID number is from the climate monitoring network (e.g. NESDIS ID, COOP Station No., WBAN ID, NRCS ID, NDBC No.). Station start is the earliest date listed in the NCDC Multi-network Metadata System.

| Station name | Acronym | Station type | Map no. | ID no. | Lat. N | Lon. W | Elev ft. | Station start |
|---|---|---|---|---|---|---|---|---|
| Brooks Camp | BRCA | SNCO | 38 | 55J01 | 58.533 | 155.767 | 150 | 1995 |
| Chigmit Mountains | CHMO | RAWS | 4 | FA6544FC | 60.2249 | 153.4675 | 4658 | 7/2009 |
| Contact Creek* | COCR | RAWS | 8 | 32803738 | 58.2076 | 155.9225 | 657 | 6/2008 |
| Coville | COVI | RAWS | 7 | 3280B12C | 58.8025 | 155.5629 | 1567 | 6/2008 |
| Drift River Terminal | DRRI | CMAN | 30 | DRFA2 | 60.5533 | 152.1367 | 53 | 9/1999 |
| Exit Glacier | EXGL | SNCO | 28 | 49L18 | 60.1903 | 149.6212 | 400 | 9/1988 |
| Exit Glacier | EXGL | SNTE | 35 | 49L18 | 60.1903 | 149.6212 | 400 | 7/2011 |
| Fishtrap Lake | FILA | SNCO | 36 | 54L02 | 60.4913 | 154.3296 | 1800 | 8/1991 |
| Fourpeaked | FOUR | RAWS | 9 | 328135C2 | 58.7057 | 153.5179 | 1074 | 6/2009 |
| Harding Icefield | HAIC | RAWS | 10 | FA656210 | 60.1325 | 149.7820 | 4335 | 7/2004 |
| Hickerson Lake | HILA | RAWS | 5 | 3280C7BC | 59.9148 | 152.8925 | 1048 | 6/2008 |
| Homer Airport | HOAI | COOP | 17 | 503665 | 59.6428 | 151.4872 | 64 | 9/1949 |
| Homer Airport | HOAI | ASOS | 24 | 25507 | 59.6428 | 151.4872 | 64 | 12/1997 |
| Iliamna Airport | ILAI | COOP | 14 | 503905 | 59.7539 | 154.9069 | 183 | 9/1949 |
| Iliamna Airport | ILAI | ASOS | 20 | 25506 | 59.7539 | 154.9069 | 183 | 12/1997 |
| Kenai Airport | KEAI | COOP | 16 | 504546 | 60.5797 | 151.2391 | 91 | 9/1949 |
| Kenai Airport | KEAI | ASOS | 23 | 26523 | 60.5797 | 151.2391 | 91 | 5/1999 |
| King Salmon Airport | KISA | COOP | 15 | 504766 | 58.6829 | 156.6563 | 47 | 7/1955 |
| King Salmon Airport | KISA | ASOS | 21 | 25503 | 58.6829 | 156.6563 | 47 | 6/1998 |
| McArthur Pass | MCPA | RAWS | 11 | 3280244E | 59.4726 | 150.3337 | 1266 | 6/2008 |
| Nuka Glacier | NUGL | SNTE | 29 | 50K06S | 59.6943 | 150.7110 | 1250 | 10/1990 |
| Pedersen Lagoon | PELA | RAWS | 34 | 326AD012 | 59.8944 | 149.7308 | 624 | 8/2011 |
| Pfaff Mine | PFMI | RAWS | 6 | FA65578A | 59.1109 | 154.8367 | 2018 | 6/2008 |
| Pilot Rock | PIRO | CMAN | 32 | PILA2 | 59.7417 | 149.4700 | 79 | 12/1999 |
| Port Alsworth | POAL | COOP | 13 | 507570 | 60.2033 | 154.3164 | 260 | 6/1960 |
| Port Alsworth | POAL | SNCO | 27 | 54L01 | 60.1921 | 154.3272 | 270 | 10/1991 |
| Port Alsworth | POAL | RAWS | 3 | FA6102CC | 60.1958 | 154.3200 | 321 | 6/1992 |
| Port Alsworth 1 SW | P1SW | CRN | 33 | USW00026562 | 60.1958 | 154.3198 | 315 | 9/2009 |
| Port Heiden | POHE | AWOS | 22 | 25508 | 56.9500 | 158.6167 | 95 | 10/2007 |
| Seward | SEWA | COOP | 19 | 508371 | 60.1039 | 149.4439 | 110 | 9/1949 |
| Seward Airport | SEAI | ASOS | 25 | 26438 | 60.1283 | 149.4167 | 22 | 4/1997 |
| Seward 8NW | S8NW | COOP | 18 | 508375 | 60.1883 | 149.6275 | 410 | 6/1983 |
| Shelikof Strait | SHST | BUOY | 31 | 46077 | 57.9200 | 154.2542 | 0 | 10/2005 |
| Snipe Lake | SNLA | RAWS | 2 | 328041A8 | 60.6103 | 154.3199 | 2315 | 6/2008 |
| Stoney | STON | RAWS | 1 | FA600036 | 61.0008 | 153.8958 | 1250 | 6/1992 |
| Telaquana Lake | TELA | COOP | 12 | T.B.D. | 60.984 | 153.924 | 1250 | 6/1997 |
| Telaquana Lake | TELA | SNCO | 26 | 53L01 | 60.983 | 153.917 | 1550 | 8/1991 |
| Three Forks | THFO | SNCO | 39 | 55J02 | 58.367 | 155.383 | 900 | 1995 |
| Upper Twin Lakes | UTLA | SNCO | 37 | 53L02 | 60.650 | 153.800 | 2000 | 8/1991 |

Contact Creek CRN is not included in this report because of the short period of record (five weeks) during the 2012 hydrologic year.

## Reporting Interval

Reporting is based on the hydrologic year (October 1 to September 30) instead of the calendar year because it allows for more data completeness and because the timing and seasonality of many physical processes that are driven by climate (e.g. onset and breakup of lake ice, glacial accumulation and ablation dynamics, and the magnitude and timing of streamflow) more closely follow the hydrologic year. Considerable data are not transmitted from many remote weather stations (i.e. RAWS operated and maintained by the SWAN) during winter months because of antenna icing (e.g. interference with GOES telemetry); however, these data are stored on-site, are retrieved during subsequent summer months, and climate databases are updated with the complete record. Reporting based on the hydrologic year is therefore more relevant, complete, and timely than reporting would be if it were based on the calendar year.

## Summary Reports and Graphs

Summary reports and graphs for the most consistently measured climate variables from 39 weather stations monitored by the SWAN are included in the Appendices and are organized alphabetically by park, climate monitoring program, and station name. Daily measures are used for generating graphs (with the exception of NRCS Snow Courses) and monthly measures are used for generating summary reports. Mean temperature, total precipitation, mean snow depth, mean wind speed and direction, and maximum wind speed are presented in graphs. Minimum, maximum, and mean temperature data, the number of frost days (where the minimum temperature is below freezing), and the number of ice days (where the maximum temperature is below freezing) are included in the summary reports. Total precipitation, average snow depth, mean and maximum wind speed, maximum wind direction, and cumulative solar radiation are also presented in the summary reports. The percentage of valid observations is reported as a measure of the reliability of the derived mean and cumulative values for all reported climate variables. Climatic normal values (arithmetic mean over a 30-year interval) from the NCDC for the 1981-2010 period and period of record mean values from the WRCC are included for stations with a long enough observational record. Summary reports and graphs for the Contact Creek CRN are not included in this report because of the short period of record (five weeks) during the 2012 hydrologic year.

## Analyses

The stations used for analysis in this summary report are six weather stations with the longest, most complete records located near three SWAN parks. These stations are Homer Airport, Iliamna Airport, Kenai Airport, King Salmon Airport, Port Alsworth, and Seward (Table 2).

# Results

## Regional Overview

### *Temperature*

The SWAN region was colder than average during the 2012 hydrologic year. Compared to the climatological normal (the prevailing set of weather conditions calculated over a 30-year period, currently 1981-2010), mean annual temperatures for long-term weather stations in the SWAN region were 2.7 to 4.0 °F below average (Table 3). Maps showing monthly temperature departures from average, which are calculated by subtracting the 30-year average monthly temperature from the observed average monthly temperature, are shown in Figure 3.

The hydrologic year began with warmer than average temperatures during October. With the exception of King Salmon and Port Alsworth, the rest of the SWAN region did not share the significantly (>4 °F) warmer than average temperatures that were experienced at more northerly areas of the state. Temperatures during November were much colder than average with temperatures ranging from 7.5 °F below average in Seward to 10.3 °F below average in Kenai. These are very large negative deviations from average temperatures (ACRC 2011a). In contrast to most of Alaska, December temperatures across much of the SWAN region were also colder than average, albeit slightly. Alaska had its coldest January on record with a statewide temperature of 14.0 °F below average (NCDC 2012). Frigid temperatures across the SWAN region ranged from 12.9 °F below average in Seward to 22.8 °F below average in King Salmon. February ushered in some relief from the cold of the preceding month with above normal temperatures observed at locations across the SWAN region. King Salmon was 5.4 °F above average for the month and Port Alsworth was 8.3 °F above average for the month. Temperatures continued their monthly flip flop from above normal to below normal in March with below average temperatures observed at locations across the SWAN region. King Salmon was the coldest – 14.7 °F below average for the month. Of note in March, sea ice extent in the Bering Sea was at or near record maximum extent since 1979, when satellite-based monitoring began (the Bering Sea region is the singular exception to decreasing sea ice extent in all months and regions; Perovich et al. 2012). April was characterized by above average temperatures on the Alaska Peninsula, but slightly colder than average temperatures on the Kenai Peninsula. May marked the first of five consecutive months with slightly colder than average temperatures across the SWAN region, conditions that persisted through September, 2012.

### *Precipitation*

The SWAN region received average to above average precipitation during the 2012 hydrologic year. Compared to the climatological normal, total annual precipitation for long-term weather stations in the SWAN region was 108 to 142 % of average (Table 4). Locations in the southern part of the region (Homer, King Salmon) were wetter than average, receiving 126 to 142 % of average precipitation whereas locations in the northern part of the SWAN region (Iliamna, Kenai, and Seward) received closer to average precipitation (108 to 112 % of average). Precipitation was not reported for Port Alsworth during the month of January, so annual measures are not valid; however, the cumulative precipitation for the remaining months was above average (122 % of average). Maps showing monthly precipitation percent of average, which is calculated by dividing the observed monthly precipitation by the 30-year average monthly precipitation, are shown for long-term weather stations in Figure 4.

In general, fall (October – December) and winter (January – March) were characterized by wetter than average conditions across the region, with the exceptions of January and March. The month of February was the wettest on record in Homer since record keeping began in 1932 (6.46 inches of precipitation). The combination of colder than average temperatures, above average precipitation, and a high frequency of storms in the Gulf of Alaska, instead of farther south (Papineau 2012), resulted in record breaking snowfall in locations across southern Alaska during the winter of 2011-2012 (ACRC 2012). April and May were drier than average (an amplification of the seasonal climate pattern where spring is typically the driest time of year in the SWAN region). The remainder of the hydrologic year was wetter than average, in fact September was one of the wettest months in history for many locations in southwest Alaska. Kenai saw 7.85 inches of precipitation in September 2012, setting a record for the most precipitation received in any month since record keeping began in 1949. Seward received 26.29 inches of precipitation – the second wettest September after 1995. The month of September was the fourth wettest since record keeping began in both Homer (5.25 inches) and Iliamna (8.21 inches). Port Alsworth received 4.78 inches of precipitation, making the month the sixth wettest September since record keeping began in 1960. The September storms responsible for this precipitation resulted in flooding and were coupled with high winds that caused significant wind damage across south central Alaska. Some of the high winds and water levels also affected interior Alaska where the Nenana River, for example, reached a record high stage (ACRC 2012).

**Table 3.** Average daily temperatures during hydrologic year 2012 (Oct. 1, 2011 to Sep. 30, 2012) and departures from 1981-2010 averages for long-term weather stations in southwest Alaska.

| Station name | Station ID | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Homer Airport | 503665 | 38.3 (0.2) | 21.6 (-7.9) | 25.8 (-1.3) | 9.2 (-15.6) | 28.0 (1.8) | 22.8 (-7.1) | 35.9 (-1.1) | 41.4 (-3.1) | 48.2 (-2.4) | 50.2 (-4.4) | 51.7 (-2.2) | 49.8 (1.7) | 35.2 (-3.5) |
| Iliamna Airport | 503905 | 38.6 (3.5) | 15.6 (-9.1) | 20.7 (-0.1) | -3.0 (-20.5) | 26.4 (6.7) | 12.1 (-11.4) | 35.7 (2.6) | 41.7 (-2.3) | 50.4 (-1.3) | 52.3 (-3.8) | 53.3 (-1.5) | 46.8 (-1.2) | 32.6 (-3.2) |
| Kenai Airport | 504546 | 36.5 (1.3) | 12.9 (-10.3) | 19.6 (0.6) | -3.2 (-19.6) | 24.2 (4.5) | 15.5 (-10.2) | 35.3 (-0.9) | 43.6 (-2.4) | 50.9 (-1.6) | 53.3 (-3.0) | 53.3 (-1.7) | 47.1 (-1.0) | 32.4 (-3.8) |
| King Salmon Airport | 504766 | 37.8 (4.3) | 15.2 (-7.7) | 17.7 (-0.9) | -6.6 (-22.8) | 24.2 (5.4) | 9.4 (-14.7) | 35.4 (1.7) | 41.1 (-3.1) | 49.1 (-2.4) | 52.4 (-3.1) | 53.0 (-1.6) | 45.7 (-1.9) | 31.2 (-4.0) |
| Port Alsworth | 507570 | 38.6 (4.1) | 14.7 (-9.1) | 18.6 (-0.8) | -- (--) | 26.9 (8.3) | 15.3 (-9.0) | 39.1 (3.9) | 45.7 (-0.3) | 53.6 (-0.7) | 55.6 (-2.3) | 55.7 (-0.2) | 47.3 (-0.1) | -- (--) |
| Seward | 508371 | 39.8 (0.2) | 23.4 (-7.5) | 26.4 (-2.5) | 14.2 (-12.9) | 31.8 (3.5) | 27.2 (-4.9) | 38.4 (-0.3) | 43.5 (-2.9) | 50.9 (-1.3) | 52.6 (-3.4) | 53.8 (-1.9) | 48.3 (-1.2) | 37.8 (-2.7) |

Temperatures are given in degrees Fahrenheit. Departures from 1981-2010 averages are given in parenthesis. Station IDs are from National Weather Service COOP stations. Monthly statistics are not reported if more than 10% of observations (three days) are missing. Annual statistics are not reported if more than 17% of observations (five days) are missing from any month. The percentage of valid observations are reported in the Appendices.

**Table 4.** Total monthly precipitation during hydrologic year 2012 (Oct. 1, 2011 to Sep. 30, 2012) and percentage versus 1981-2010 averages for for long-term weather stations in southwest Alaska.

| Station name | Station ID | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Homer Airport | 503665 | 3.24 (126) | 1.59 (57) | 5.09 (165) | 2.09 (79) | 6.46 (378) | 0.47 (28) | 0.72 (67) | 0.81 (99) | 1.78 (217) | 1.22 (78) | 1.90 (81) | 5.25 (159) | 30.63 (126) |
| Iliamna Airport | 503905 | 3.02 (94) | 1.71 (80) | 1.66 (109) | 0.11 (9) | 0.80 (75) | 0.45 (58) | 0.27 (32) | 1.14 (97) | 2.26 (170) | 2.97 (103) | 5.24 (126) | 8.21 (180) | 27.85 (112) |
| Kenai Airport | 504546 | 1.80 (68) | 0.39 (28) | 1.67 (124) | 0.43 (45) | 1.34 (152) | 0.24 (38) | 0.30 (51) | 0.39 (43) | 1.87 (175) | 2.50 (136) | 0.82 (31) | 7.85 (240) | 19.59 (108) |
| King Salmon Airport | 504766 | 3.26 (157) | 2.73 (196) | 1.65 (134) | 1.12 (110) | 1.13 (149) | 1.35 (192) | 0.56 (58) | 1.63 (130) | 2.47 (150) | 4.77 (207) | 2.65 (90) | 4.38 (137) | 27.69 (142) |
| Port Alsworth | 507570 | 1.23 (82) | 1.14 (78) | 1.59 (175) | -- (--) | 0.69 (84) | 0.33 (50) | 0.13 (27) | 0.37 (90) | 0.41 (55) | 1.36 (102) | 3.12 (165) | 4.78 (216) | -- (--) |
| Seward | 508371 | 12.82 (137) | 2.91 (40) | 8.59 (90) | 3.34 (41) | 8.11 (134) | 2.09 (47) | 2.78 (62) | 3.24 (96) | 1.59 (66) | 4.13 (148) | 3.11 (55) | 26.29 (267) | 78.99 (108) |

Percentages of monthly average precipitation versus 1981-2010 given in parentheses. Station IDs are from National Weather Service COOP stations. Monthly statistics are not reported if more than 10% of observations (three days) are missing. Annual statistics are not reported if more than 17% of observations (five days) are missing from any month. The percentage of valid observations are reported in the Appendices.

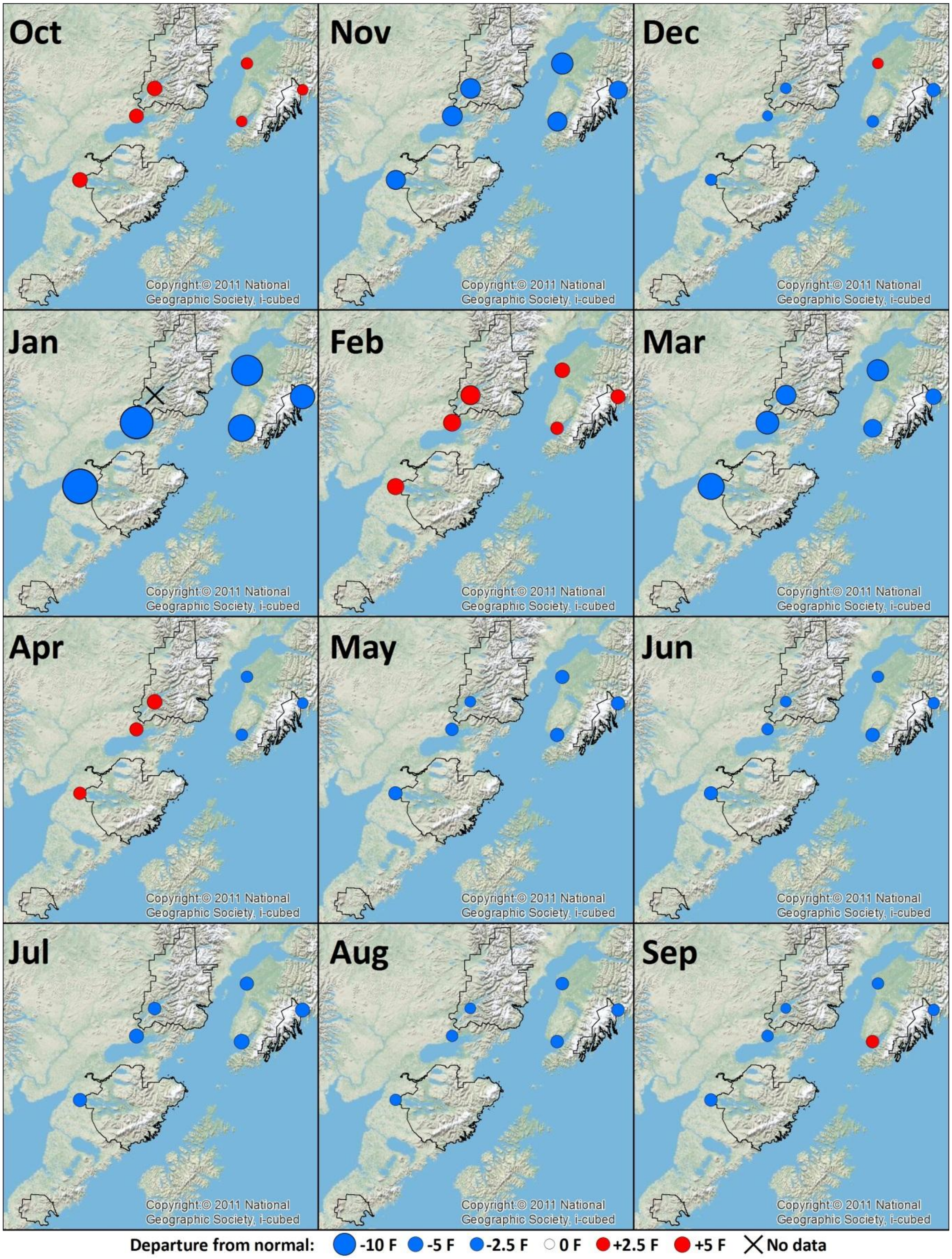


**Figure 3.** Monthly temperature anomalies (departure from 1981-2010 averages) for long-term weather stations in southwest Alaska during the 2012 hydrologic year. Red symbols indicate warmer than average conditions and blue symbols indicate cooler than average conditions.

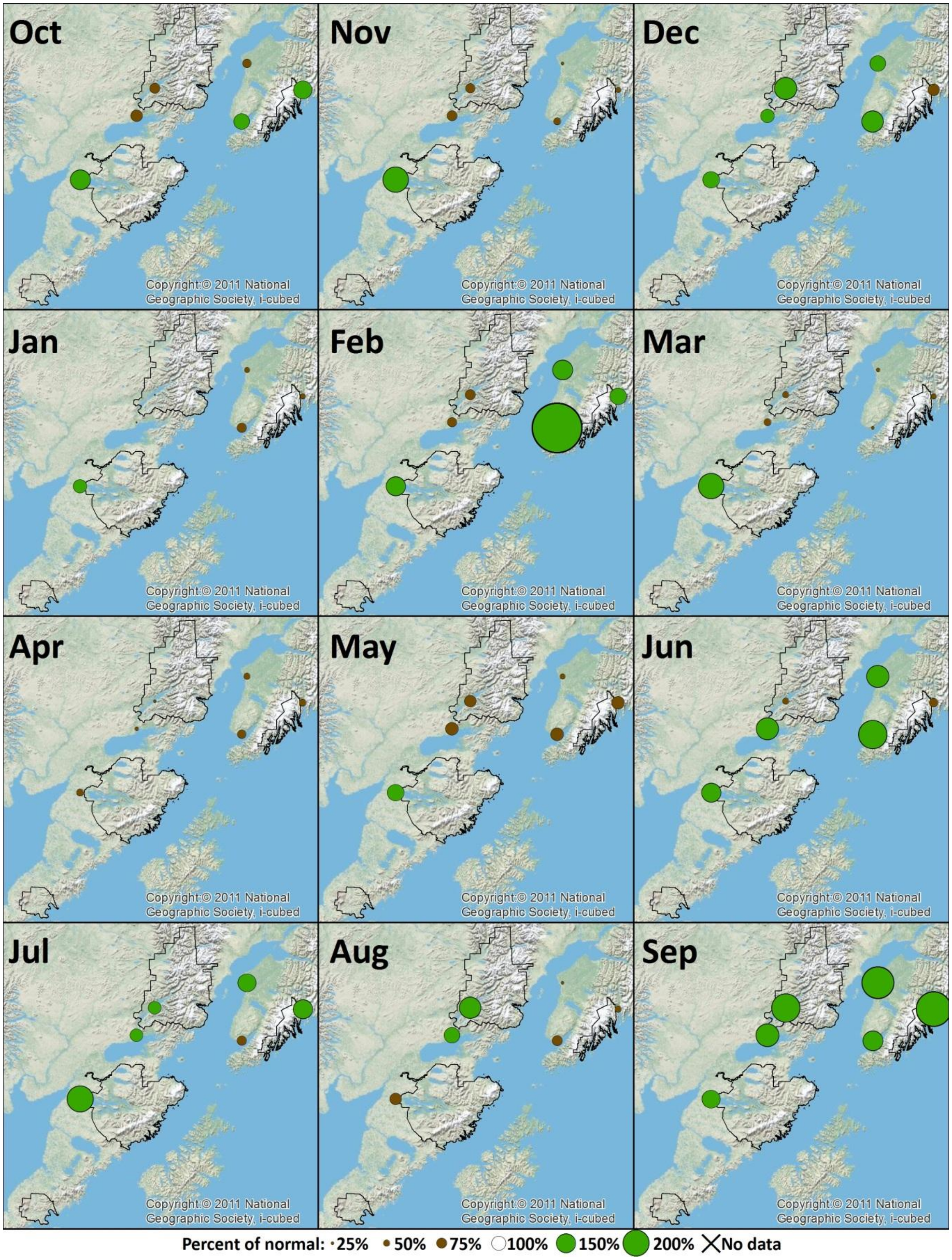


**Figure 4.** Monthly precipitation anomalies (percentages of 1981-2010 averages) for long-term weather stations in southwest Alaska during the 2012 hydrologic year. Green symbols indicate wetter than average conditions, brown symbols indicate drier than average conditions.

## Location of Summary Reports and Graphs for Individual Stations

Summary reports and graphs for consistently measured climate variables from 39 weather stations monitored by the SWAN (shown in Figure 2 and listed in Table 2) are included in the Appendices and are organized alphabetically by park, climate monitoring program, and station name.

## Limitations

Measuring winter-time precipitation (i.e. snowfall, snow depth, and snow water equivalent) is difficult to accomplish across the SWAN region. Snow surveys are relatively accurate, but they are only measured once a month (at best) and at a few key locations. Most remote weather stations have limited (photovoltaic) power supplies and therefore rely on unheated tipping buckets, which are only capable of accurately measuring liquid precipitation (e.g. rain). Although sonic snow depth sensors are used at many of these stations (e.g. RAWS), snow water equivalent is not measured. A few remote weather stations utilize storage or displacement precipitation gauges or snow pillows (Harding Icefield, Nuka Glacier). The logistical challenges and costs associated with maintaining those gauges or pillows (which are filled with an antifreeze solution) and protecting them from wildlife are significant and make them impractical to operate at more than a few key locations. Undercatch (the difference between the actual amount of precipitation and the amount measured by a precipitation gauge) is a problem at the Harding Icefield because of the windy nature of the site. Currently, accurate year-round precipitation is only measured at a few locations within the SWAN, including all of the long term stations (Table 3) discussed above. Summarized precipitation values reported in the tables in the Appendices for individual stations that are only capable of measuring liquid precipitation are indicated with notes. Precipitation values reported for these stations are not considered valid if the maximum air temperature is below 31.1 °F and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values. False precipitation may also be recorded at RAWS during strong wind events. Vibrations from strong winds shaking the station can cause tipping buckets to tip excessively, artificially exaggerating any precipitation that may (or may not) be occurring. Precipitation values reported for these stations are not considered valid when maximum wind speeds exceed 70 mph and this is reflected in the percentage of valid observations.

# Discussion

## Historical Context

### *Cautionary Note*

Assessments of the historical context of trends and average conditions for SWAN region weather stations should be viewed in the context of the available record. Although the 50 to 80 year observational period for the long-term stations discussed above provides an adequate basis for evaluating the historical context of the recent climate with respect to climatological normal or the period of record, this period may be too short for discerning long-term changes in climate. For example, the period of record at the long-term weather stations discussed herein may span only one complete PDO cycle. The climate data for the long-term stations discussed above has been subjected to a suite of quality assurance checks (NCDC 2011), but it has not been adjusted for bias resulting from historical changes in instrumentation and observing practices. Therefore, long-term climate trends are not calculated or reported here. Period of record means are used exclusively as a basis for historical context in this discussion.

### *Temperature and Precipitation at Long-Term Stations*

Relatively complete daily records of maximum temperature, minimum temperature, and precipitation are available for the last 50 to 80 years from six long-term stations (Homer Airport, Iliamna Airport, Kenai Airport, King Salmon Airport, Port Alsworth, and Seward) located across the SWAN region. Temperature and precipitation data are summarized by hydrologic year for each of the long-term stations in Figures 5 – 10. Mean daily maximum temperatures are plotted in box A. Values for years where no month is missing more than five values are shown with colored symbols. Values for years where one or more months have more than five missing values (sometimes an entire month of data is missing) should not be considered representative and are only shown for reference (these data are shown with white symbols). Mean daily maximum temperature anomalies are plotted in box B. These anomalies were calculated by subtracting the period of record mean daily maximum temperature from the observed mean daily maximum temperature for that year. The sample standard deviation is provided for reference and helps to identify which anomalies are statistically significant. Both the period of record means and anomalies were calculated only for years where no month is missing more than five daily values. Mean daily minimum temperatures are plotted in box C. Mean daily minimum temperature anomalies are plotted in box D. Total precipitation (for the hydrologic year) is plotted in box E. Precipitation anomalies are plotted in box F. Mean annual temperature anomalies for each of the long-term stations for years where no month is missing more than five daily values are shown in Figure 11. The symbols and methods used to generate these plots are identical to those described above.

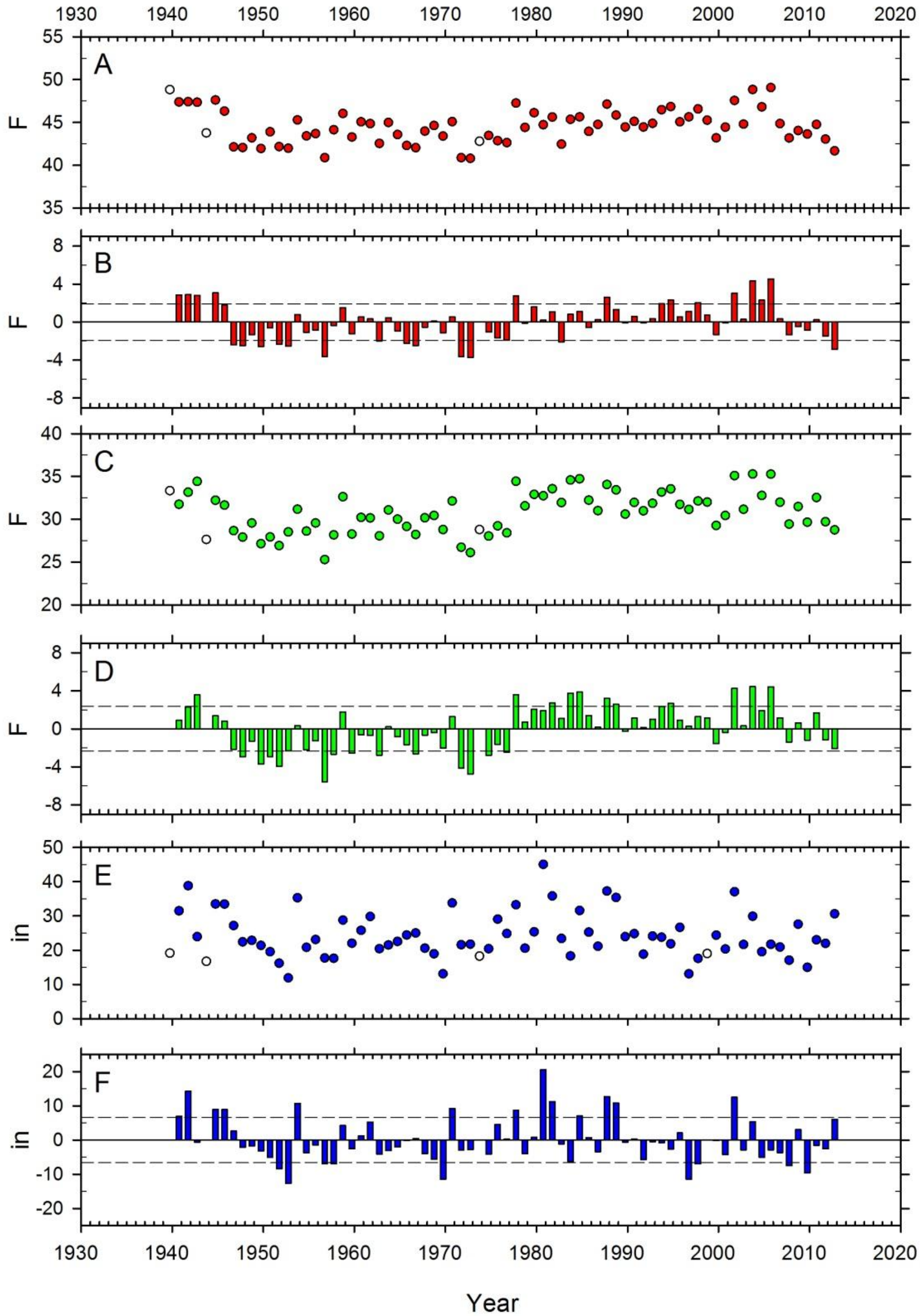


**Figure 5.** Temperature (*T*) and precipitation (*P*) at Homer Airport for 1939-2012 hydrologic years. **A)** Mean maximum *T*, **B)** maximum *T* anomalies, **C)** mean minimum *T*, **D)** minimum *T* anomalies, **E)** total annual *P*, **F)** annual *P* anomalies. Colored symbols represent years where no month is missing >5 values, white symbols represent years where ≥1 month is missing >5 values. Anomalies and standard deviations (dashed lines) calculated using years where no month is missing >5 values.

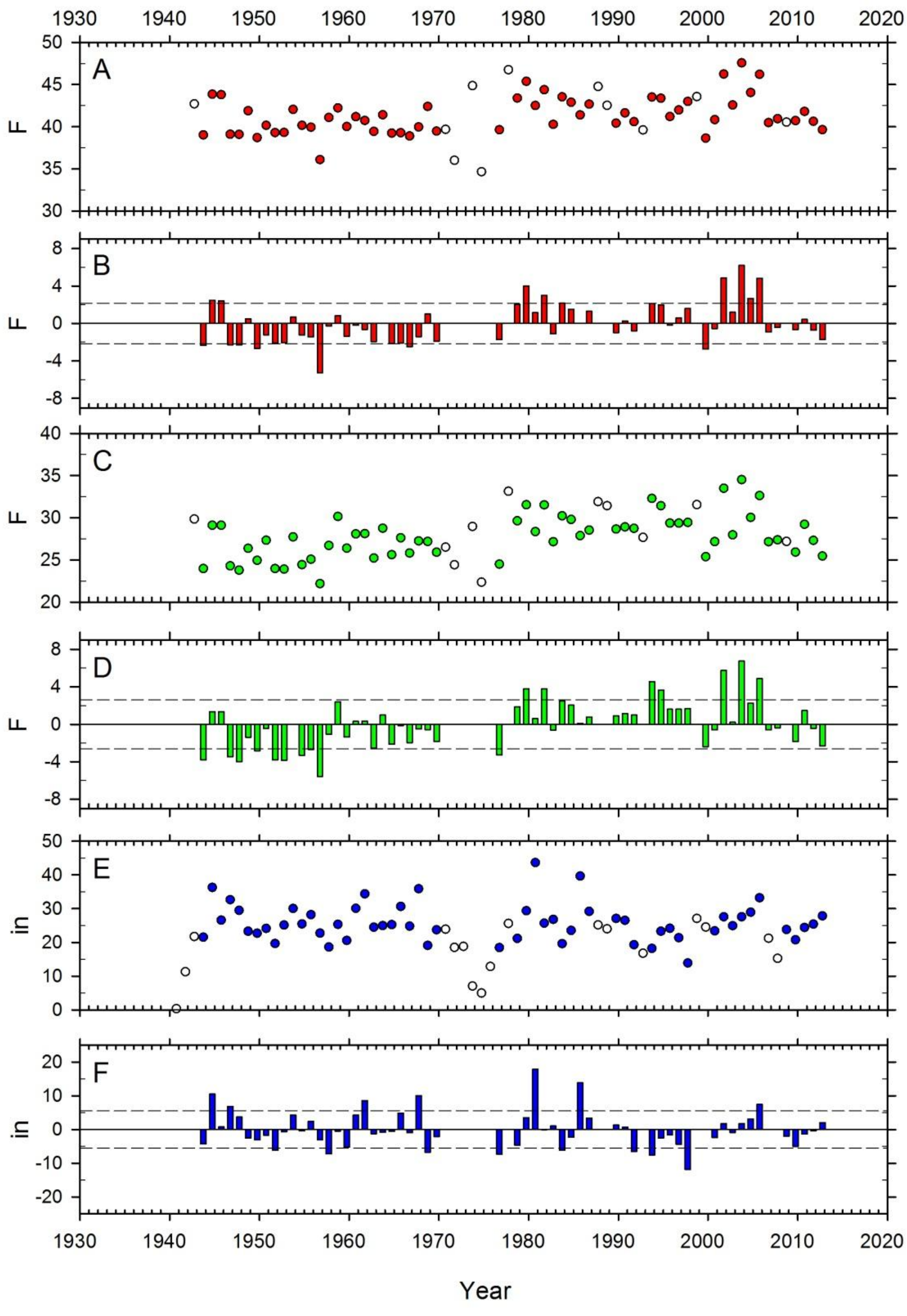


**Figure 6.** Temperature (*T*) and precipitation (*P*) at Iliamna Airport for 1943-2012 hydrologic years. **A)** Mean maximum *T*, **B)** maximum *T* anomalies, **C)** mean minimum *T*, **D)** minimum *T* anomalies, **E)** total annual *P*, **F)** annual *P* anomalies. Colored symbols represent years where no month is missing >5 values, white symbols represent years where ≥1 month is missing >5 values. Anomalies and standard deviations (dashed lines) calculated using years where no month is missing >5 values.

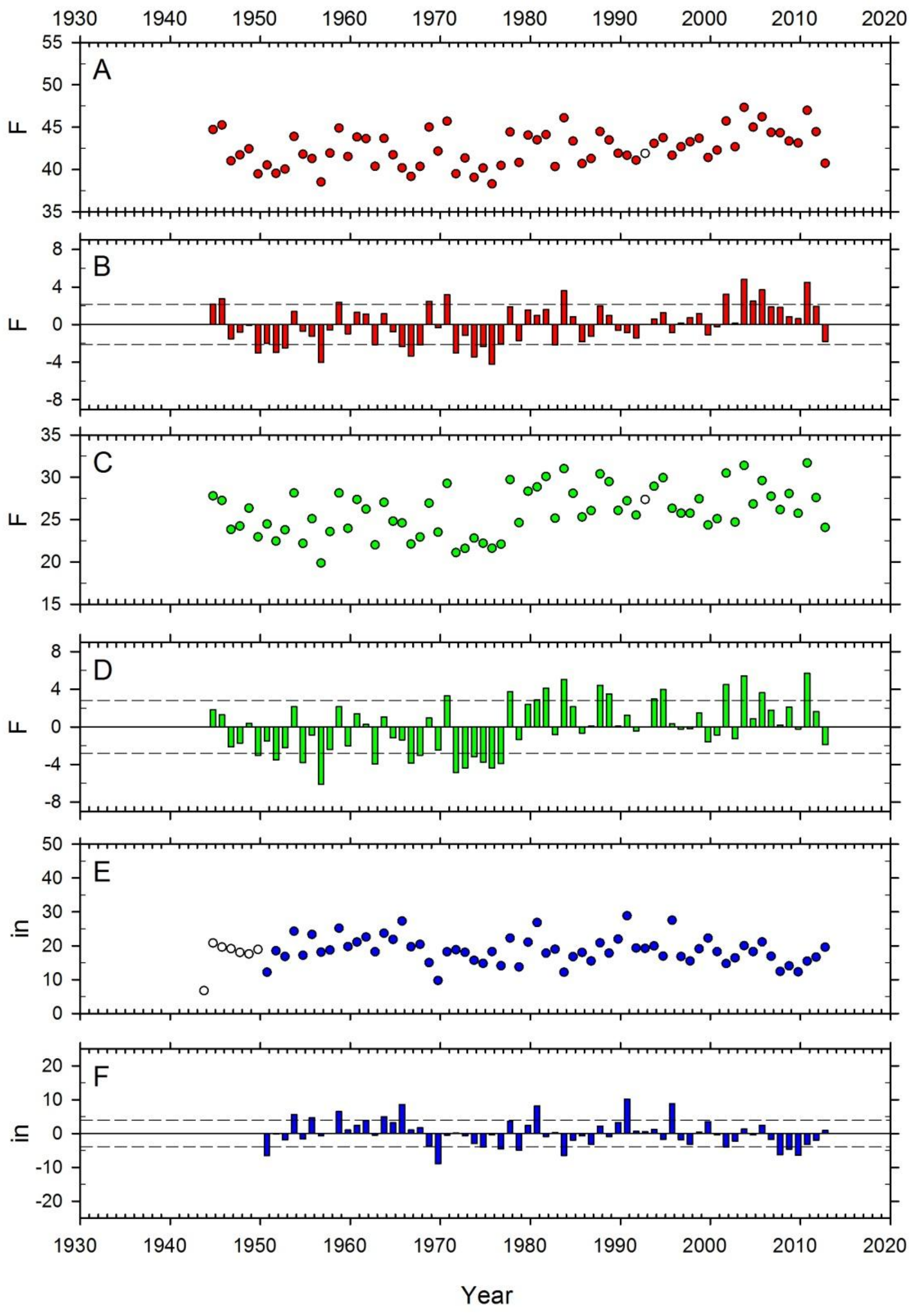


**Figure 7.** Temperature (*T*) and precipitation (*P*) at Kenai Airport for 1944-2012 hydrologic years. **A)** Mean maximum *T*, **B)** maximum *T* anomalies, **C)** mean minimum *T*, **D)** minimum *T* anomalies, **E)** total annual *P*, **F)** annual *P* anomalies. Colored symbols represent years where no month is missing >5 values, white symbols represent years where ≥1 month is missing >5 values. Anomalies and standard deviations (dashed lines) calculated using years where no month is missing >5 values.

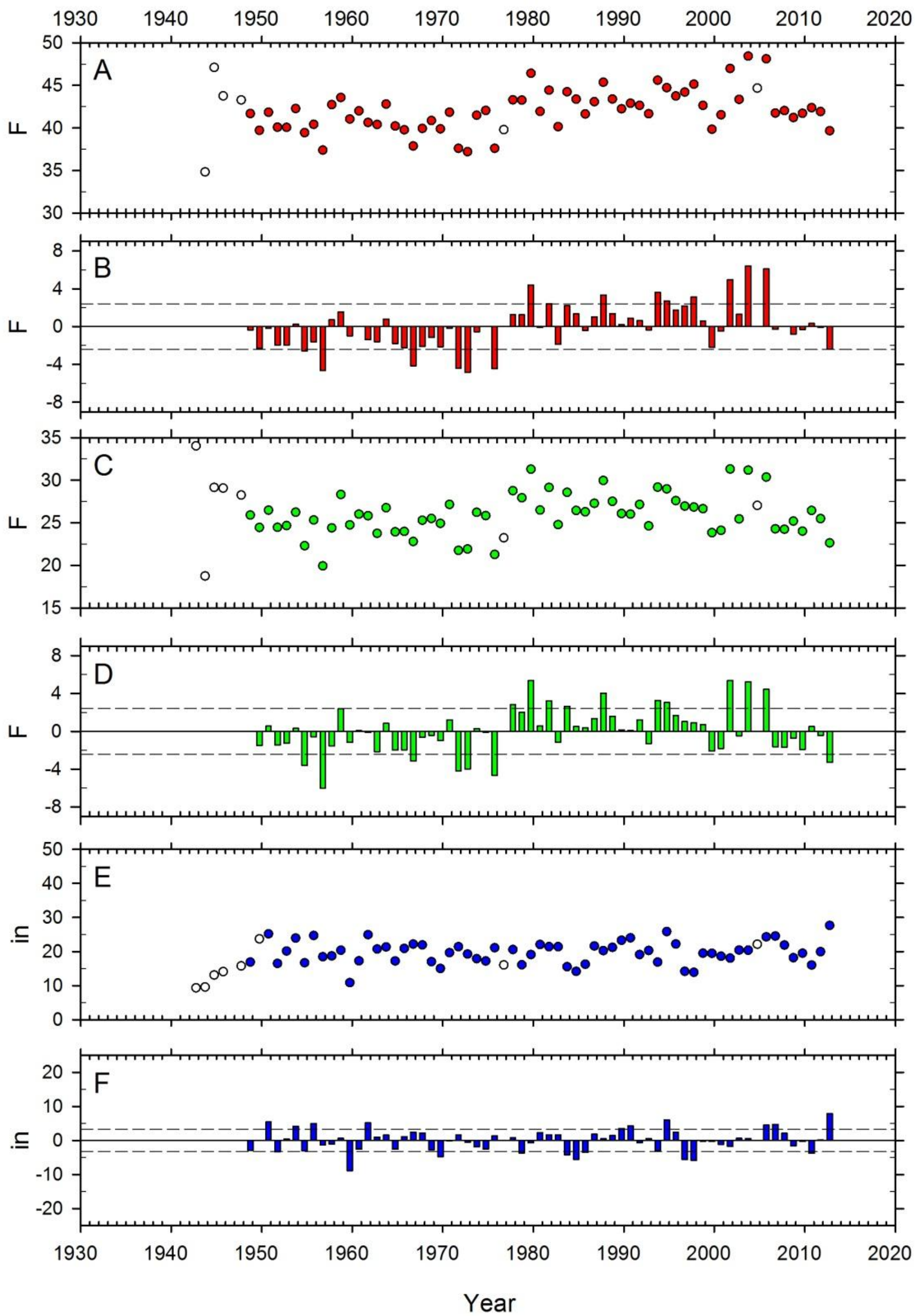


**Figure 8.** Temperature (*T*) and precipitation (*P*) at King Salmon Airport for 1942-2012 hydrologic years. **A)** Mean maximum *T*, **B)** maximum *T* anomalies, **C)** mean minimum *T*, **D)** minimum *T* anomalies, **E)** total annual *P*, **F)** annual *P* anomalies. Colored symbols represent years where no month is missing >5 values, white symbols represent years where ≥1 month is missing >5 values. Anomalies and standard deviations (dashed lines) calculated using years where no month is missing >5 values.

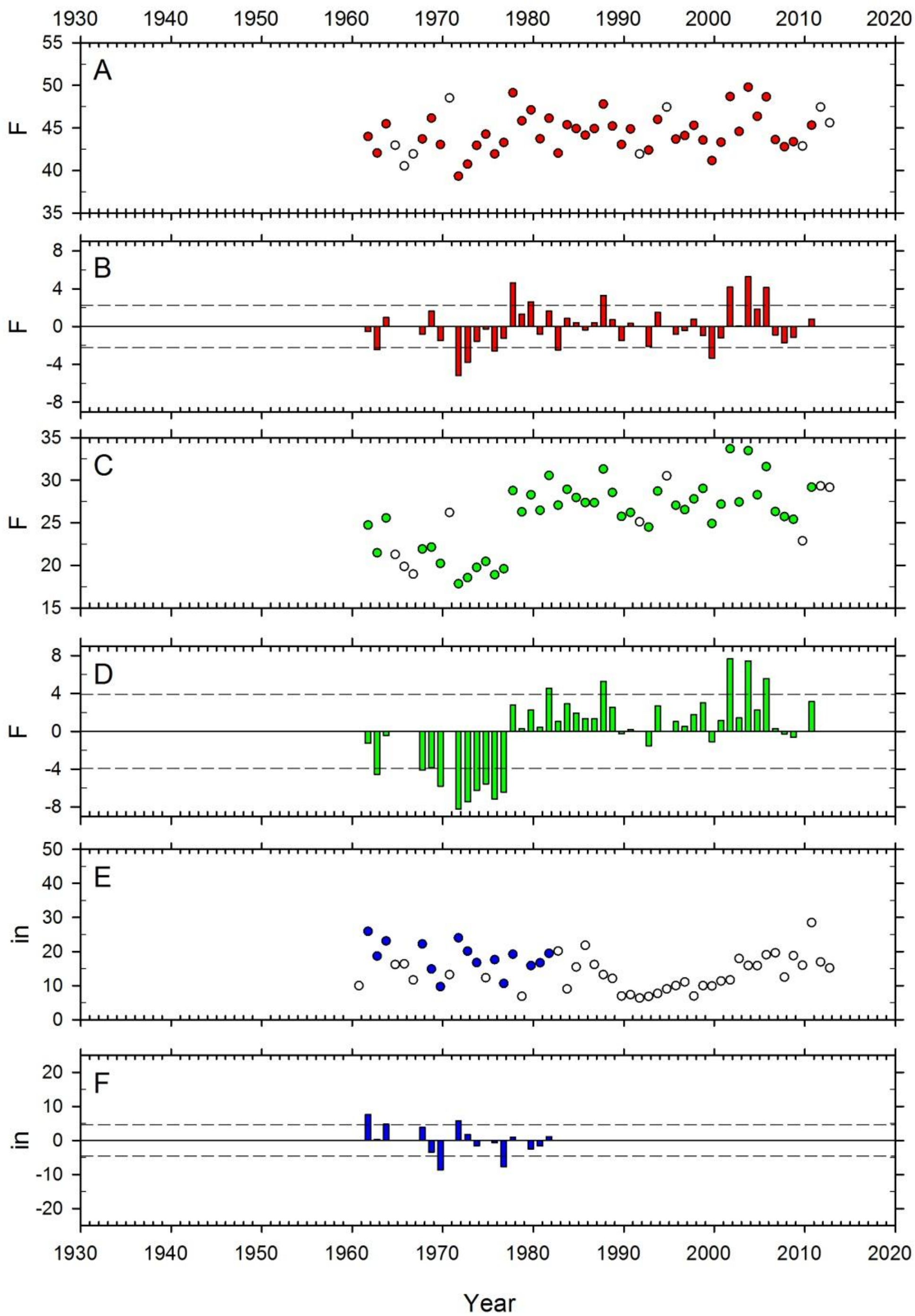


**Figure 9.** Temperature (*T*) and precipitation (*P*) at Port Alsworth for 1960-2012 hydrologic years. **A)** Mean maximum *T*, **B)** maximum *T* anomalies, **C)** mean minimum *T*, **D)** minimum *T* anomalies, **E)** total annual *P*, **F)** annual *P* anomalies. Colored symbols represent years where no month is missing >5 values, white symbols represent years where ≥1 month is missing >5 values. Anomalies and standard deviations (dashed lines) calculated using years where no month is missing >5 values.

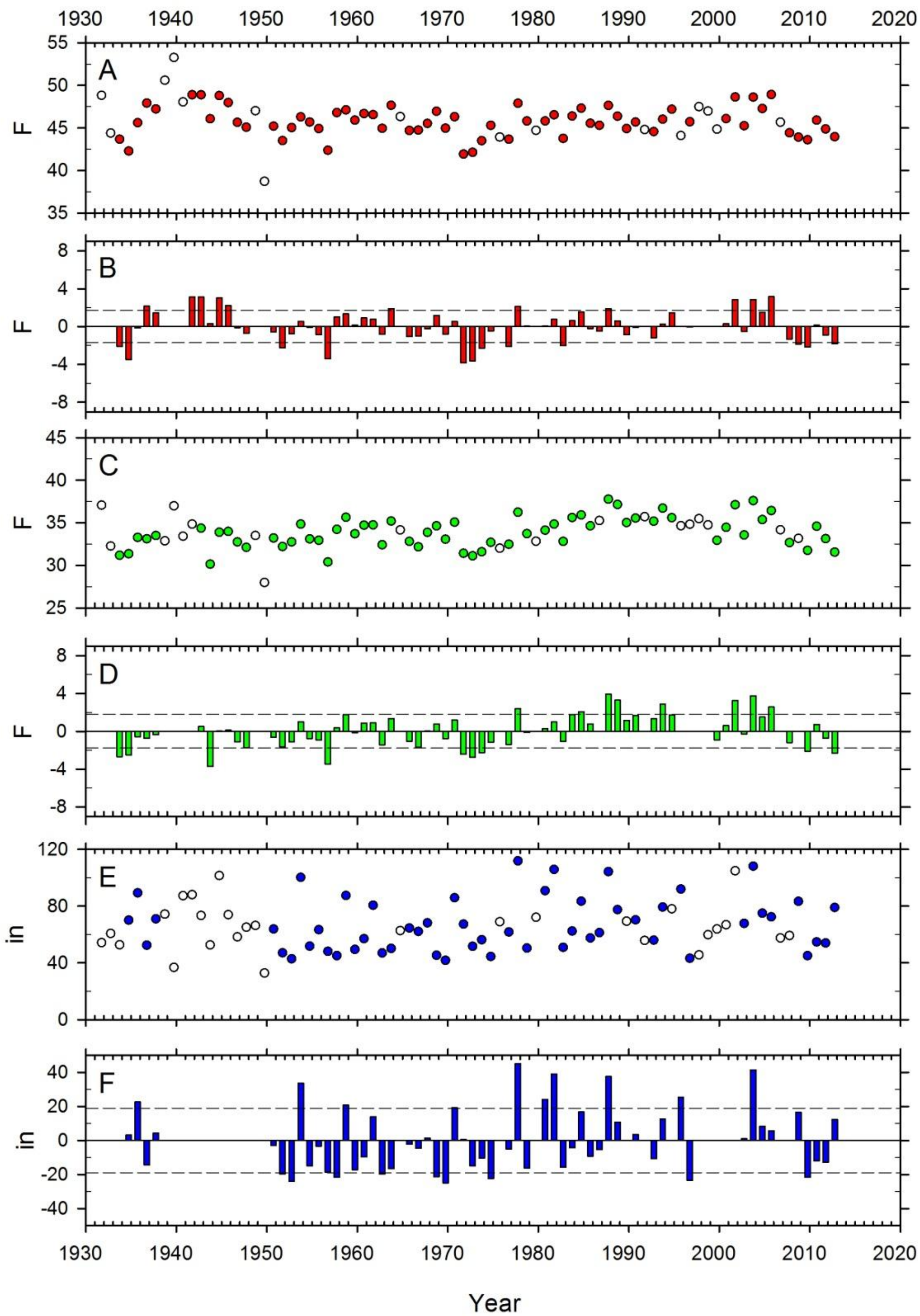


**Figure 10.** Temperature (*T*) and precipitation (*P*) at Seward for 1931-2012 hydrologic years. **A)** Mean maximum *T*, **B)** maximum *T* anomalies, **C)** mean minimum *T*, **D)** minimum *T* anomalies, **E)** total annual *P*, **F)** annual *P* anomalies. Colored symbols represent years where no month is missing >5 values, white symbols represent years where ≥1 month is missing >5 values. Anomalies and standard deviations (dashed lines) calculated using years where no month is missing >5 values.

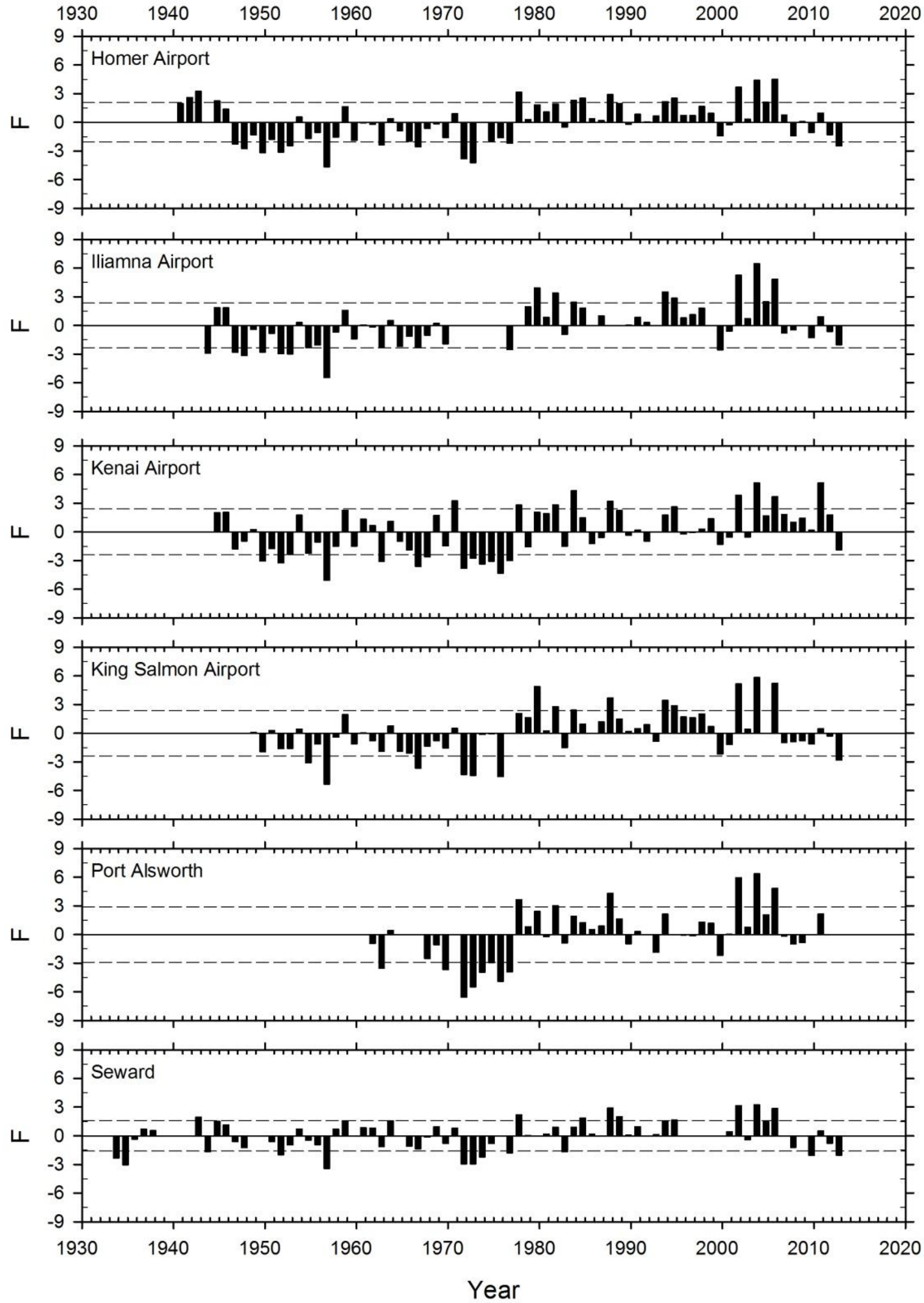


**Figure 11.** Mean annual temperature anomalies at the Homer Airport, Iliamna Airport, Kenai Airport, King Salmon Airport, Port Alsworth and Seward for the 1931-2012 hydrologic years. Only years where no month is missing more than five daily values are shown. Anomalies and sample deviations (dashed lines) calculated only for years where no month is missing more than five daily values.

***Assessment***

An abrupt positive shift in temperature beginning during the 1977 hydrologic year is evident at five of the long-term stations (Kenai, King Salmon, Homer, Port Alsworth, and Seward). This shift is not as noticeable at Iliamna, because it is somewhat obscured by the poor observational record during the 1971-1977 hydrologic years. The increase in minimum temperatures is greater than the increase in maximum temperatures (boxes A and C in Figures 5 – 10). This shift probably reflects generally warmer winter conditions beginning in the late 1970s, and has been well correlated with the shift from negative (cool phase) to positive (warm phase) PDO conditions (e.g. Simpson et al. 2002; Hartman and Wendler 2005).

With the exception of the 2010 hydrologic year, the past seven hydrologic years (2006-2012) have been characterized by mean annual temperatures equal to or slightly colder than the period of record mean at Homer, Iliamna, King Salmon, Port Alsworth, and Seward (Figure 11). In contrast, mean annual temperatures for these five locations were characterized by mean annual temperatures equal to or significantly warmer than the period of record mean during the 2001 to 2005 hydrologic years. Mean annual temperatures during 10 of the past 12 hydrologic years (2001 and 2003-2011) were generally equal to or significantly warmer than the period of record mean at Kenai. The warm temperature anomalies at Kenai during recent hydrologic years are inconsistent with conditions observed at the other long-term stations. The cause of these anomalies isn't clear and should be explored.

The colder than average temperatures experienced in southwest Alaska for the past seven hydrologic years starkly contrast the warmer than average conditions observed across the rest of the high latitudes, the contiguous United States (Figure 12), and globally. For example, the contiguous United States average annual temperature for the 2012 calendar year was the warmest year in the 1895-2012 period of record (NCDC 2012). The apparent cooling trend observed in Alaska during the first decade of the 21$^{st}$ century is described in a recent paper (Wendler and Chen 2012) and discussed in relation to the Pacific Decadal Oscillation (PDO).

The historical context for precipitation is less clear. The 2012 hydrologic year was wetter than the period of record mean at Homer, Iliamna, Kenai, King Salmon, and Seward (box D in Figures 5-10; the precipitation record at Port Alsworth in recent years is not complete enough for evaluation). These wetter than average conditions during the 2012 hydrologic year contrast the generally drier than period of record mean conditions that have been observed in recent years at Homer, Iliamna, and Kenai. For example, King Salmon saw its wettest hydrologic year on record in 2012. Seward is characterized by wide interannual variability in precipitation over the entire period of record (Figure 10).

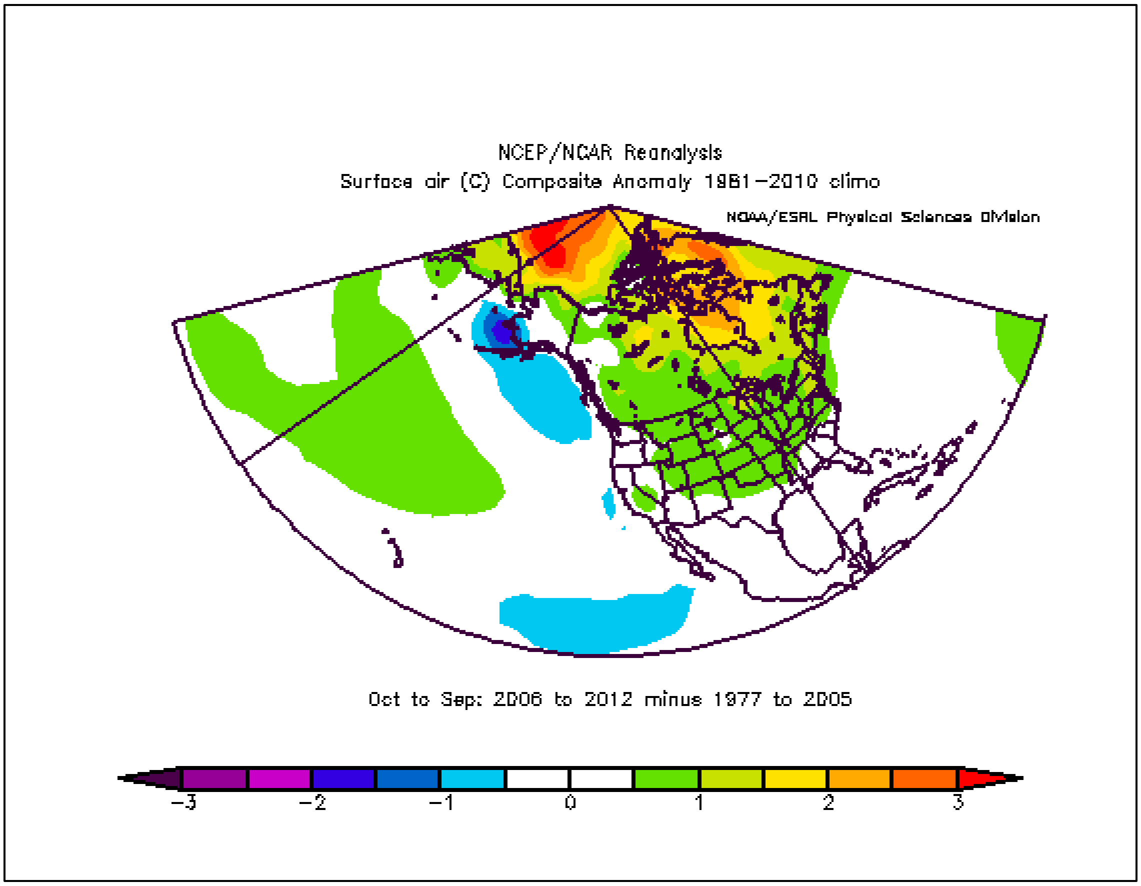


**Figure 12. S**urface air temperature composite anomaly for part of the northern hemisphere (October - September 2006 to 2012 minus 1977 to 2005). Figure was generated using the NOAA/ESRL Physical Sciences Division website (http://www.esrl.noaa.gov/psd/) using NCEP reanalysis data (Kalnay et al. 1996). Climate means are based on 1981-2010.

***PDO Conditions***

The 2012 hydrologic year was characterized by negative (cool phase) PDO conditions (JISAO 2013). These negative PDO conditions are reflected by cold sea surface temperature (SST) anomalies in the Gulf of Alaska and Bering Sea (within a few hundred miles of shore) and warm SST anomalies in the central North Pacific (Figure 13). Negative (cool phase) PDO conditions have prevailed since August 2006 with the notable exception of much of the 2010 hydrologic year, which was characterized by neutral to slightly positive PDO conditions.

PDO conditions are moderately correlated to temperature. Temperatures in and near the Gulf of Alaska are often cooler than normal when negative PDO conditions exist (Zhang et al. 1996; Mantua et al. 1997). It has also been suggested that drier than normal conditions occur in the Gulf of Alaska region north of about 57° N latitude and on the Alaska Peninsula when negative PDO conditions exist (Mantua et al. 1997; Papineau no date). Other studies, however, found no relationship between PDO and precipitation in this region (L'Heureux et al. 2004).

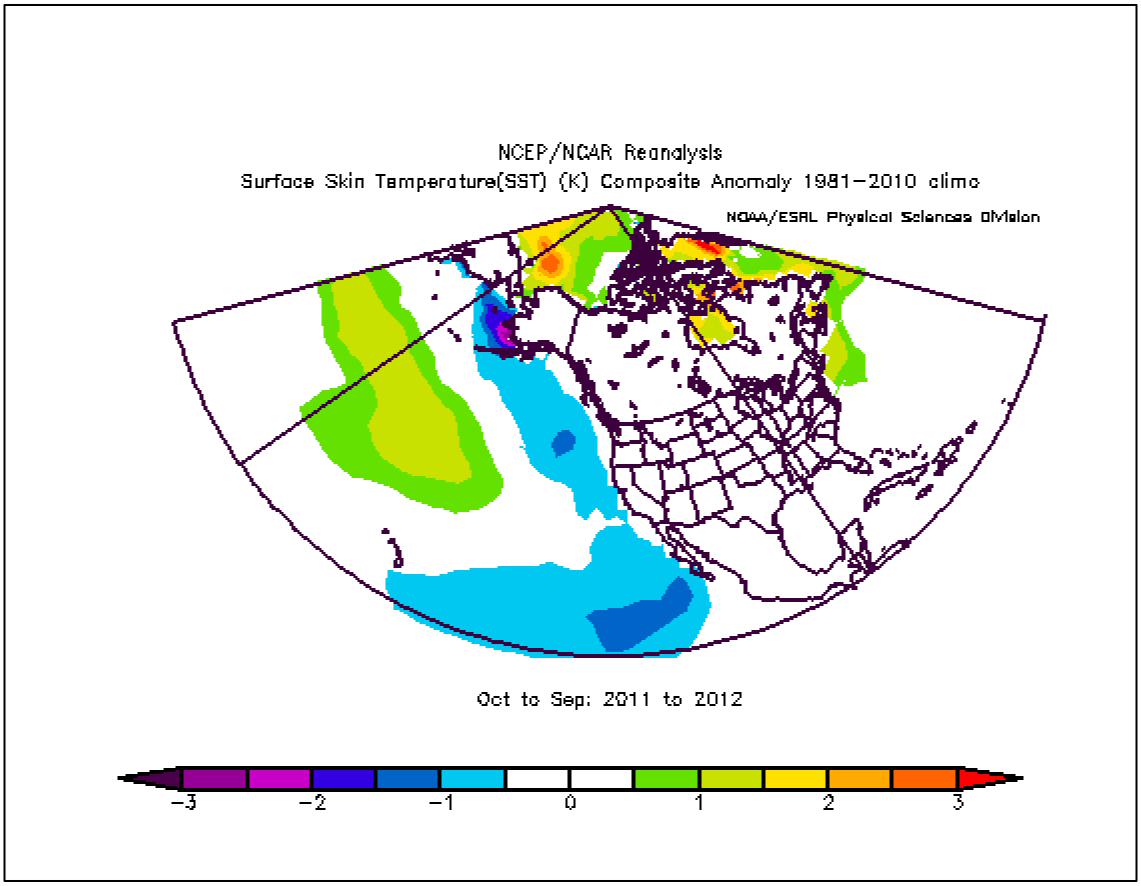


**Figure 13.** Sea surface temperature composite anomaly for the North Pacific area (October 2011 - September 2012). Figure was generated using the NOAA/ESRL Physical Sciences Division website (http://www.esrl.noaa.gov/psd/) using NCEP reanalysis data (Kalnay et al. 1996). Climate means are based on 1981-2010.

## ***ENSO Conditions***

The 2012 hydrologic year was generally characterized by La Niña (cool phase ENSO) conditions (NWS Climate Prediction Center 2013). A weak La Niña event developed in the fall of 2011 and persisted through the winter of 2012. La Niña conditions are moderately-to-highly correlated to temperature and weakly correlated to precipitation. Temperatures are typically cooler than normal and precipitation is drier than normal in the Gulf of Alaska region when La Niña conditions exist (Papineau 2001; Papineau no date). The above average precipitation observed during the 2012 hydrologic contrasts this general characterization.

A rigorous comparison of temperature and precipitation data from long-term stations in the SWAN region to recent ENSO events (listed in Table 5) has not been done. However, a cursory analysis indicates that temperature data from the long-term stations are better correlated to El Niño events than La Niña events. Warm annual temperature anomalies occurred during all but two recent El Niño events (1992 and 2007) during the last 30 years, whereas an approximately equal number of both warm and cold annual temperature anomalies occurred during recent La Niña events. This quick comparison did not consider the importance of seasonal temperature anomalies nor the duration and intensity of individual ENSO events.

**Table 5.** El Niño and La Niña events (since 1950) of varying intensity listed by hydrologic year (NWS Climate Prediction Center, 2013). An event is defined as exceeding ±0.5 °C Oceanic Niño Index for five consecutive overlapping three-month running (e.g. June-August-September) seasons.

| El Niño events | El Niño events | La Niña events | La Niña events |
|---|---|---|---|
| 1958 | 1992 | 1950 | 1975 |
| 1964 | 1995 | 1951 | 1976 |
| 1966 | 1998 | 1955 | 1985 |
| 1969 | 2003 | 1956 | 1989 |
| 1970 | 2005 | 1957 | 1996 |
| 1973 | 2007 | 1963 | 1999 |
| 1977 | 2010 | 1965 | 2000 |
| 1978 | | 1968 | 2001 |
| 1983 | | 1971 | 2008 |
| 1987 | | 1972 | 2011 |
| 1988 | | 1974 | 2012 |

## Climatic Extremes and Significant Weather Events

Climatic extremes during the 2012 hydrologic year are listed in Table 6. Maximum temperatures recorded across the SWAN region range from 60 °F (Shelikof Strait BUOY) to 83 °F (Port Alsworth RAWS). Minimum temperatures recorded across the SWAN region range from -45 °F (Telaquana Lake COOP) to 9 °F (Pedersen Lagoon RAWS). The maximum wind speed (instantaneous gust) documented was southeast at 129 mph at the Pedersen Lagoon. The number of frost days (a day on which the minimum air temperature falls below 32 °F) range from 99 days (Shelikof Strait BUOY) to 296 days (Chigmit Mountains RAWS). The number of ice days (a day on which the maximum air temperature does not rise above 32 °F) range from 56 days (Pedersen Lagoon RAWS) to 230 days (Chigmit Mountains RAWS).

Significant weather events that occurred at a large scale (i.e. across the SWAN region) during the 2012 hydrologic year included the following events; pronounced cold snaps in mid-November, mid-December, mid-January, and early March; mid-winter thaw events in early December, mid-December, mid-January and early February; and significant mid-winter rain events in early December, late December, and early February. Noteworthy snowfall events occurred in late October, mid-December, early January, and late February. The month of February was the wettest on record in Homer since record keeping began in 1932. Unseasonably high rainfall occurred in June, July, and September. In fact, September was one of the wettest months in history for many locations in southwest Alaska. Kenai set a record for the most precipitation received in any month since record keeping began in 1949. Seward saw the second wettest September after 1995. Strong (>50 mph), regional wind events occurred with an approximate frequency of 2-9 times per month during October-March, 1-3 times per month during April-August, and 8 times during September (based on data from 10 SWAN RAWS), when four unseasonably strong storms impacted much of southwest and south central Alaska.

**Table 6.** Climatic extremes and significant weather events during the 2012 hydrologic year at weather stations across southwest Alaska.

| Station name | Station type | Max temp | Min temp | Max wind speed | Max wind direction | Frost days | Ice days |
|---|---|---|---|---|---|---|---|
| Chigmit Mountains | RAWS | 61.2 | -33.0 | -- | -- | 296 | 230 |
| Contact Creek | RAWS | 75.2 | -33.0 | 69.4 | 324 | 214 | 96 |
| Coville | RAWS | 73.9 | -27.2 | 88.8 | -- | 214 | 112 |
| Drift River Terminal | CMAN | 63.9 | -8.9 | 51.9 | | 165 | 102 |
| Exit Glacier | SNTE | 77.7 | -21.5 | | | 206 | 81 |
| Fourpeaked | RAWS | -- | -- | -- | -- | -- | -- |
| Harding Icefield | RAWS | 69.8 | -14.8 | 119.5 | 142 | 287 | 211 |
| Hickerson Lake | RAWS | 74.5 | -9.6 | -- | -- | 182 | 108 |
| Homer Airport | COOP | 66 | -13 | | | 200 | 85 |
| Homer Airport | ASOS | 69 | -13 | | | 192 | 87 |
| Iliamna Airport | COOP | 76 | -22 | | | 174 | 87 |
| Iliamna Airport | ASOS | 76 | -21 | | | 173 | 87 |
| Kenai Airport | COOP | 73 | -31 | | | 201 | 106 |
| Kenai Airport | ASOS | 72 | -28 | | | 197 | 110 |
| King Salmon Airport | COOP | 78 | -40 | | | 198 | 93 |
| King Salmon Airport | ASOS | 77 | -40 | | | 194 | 97 |
| McArthur Pass | RAWS | -- | -- | -- | -- | -- | -- |
| Nuka Glacier | SNTE | 67.8 | -16.9 | | | 211 | 111 |
| Pedersen Lagoon | RAWS | 69.6 | 9.3 | 129.3 | 308 | 153 | 56 |
| Pfaff Mine | RAWS | 69.3 | -28.8 | 96.2 | 110 | 224 | 139 |
| Pilot Rock | CMAN | -- | -- | -- | -- | -- | -- |
| Port Alsworth | COOP | 82 | -- | | | -- | -- |
| Port Alsworth | RAWS | 83 | -43 | 36 | 61 | 215 | 99 |
| Port Alsworth 1 SW | CRN | 79.5 | -42 | | | 222 | 98 |
| Port Heiden | AWOS | 72 | -18 | | | 169 | 79 |
| Seward | COOP | 71 | -5 | | | 165 | 71 |
| Seward Airport | ASOS | 70 | -4 | | | 160 | 72 |
| Seward 8NW | COOP | 79 | -- | | | -- | -- |
| Shelikof Strait | BUOY | 59.5 | 5.7 | 70.2 | | 99 | 64 |
| Snipe Lake | RAWS | 72.7 | -32.8 | 77.0 | 122 | 224 | 144 |
| Stoney | RAWS | 82 | -- | -- | -- | -- | -- |
| Telaquana Lake | COOP | 76 | -45 | | | -- | -- |

Temperatures are degrees Fahrenheit. Wind speed is miles per hour. Wind direction is degrees (true) from north. Frost days are defined as a day on which the minimum air temperature falls below 32 °F. Ice days are defined as a day on which the maximum air temperature does not rise above 32 °F. Annual statistics are not reported if more than 17% of observations (five days) are missing from any month and are identified with double dashes (--). Elements that are not reported by a particular station are blank. The percentage of valid observations are reported in the Appendices.

## Status of Climate Monitoring in Network Parks

The SWAN maintained the 10 weather stations that it operates during the 2012 hydrologic year. Four weather stations (Chigmit Mountains, Fourpeaked, Harding Icefield, and McArthur Pass) were accessed by helicopter (two separate helicopter trips were made to Fourpeaked). The other stations were accessed by fixed-wing aircraft, boat, and foot. The Chigmit Mountains RAWS will no longer be accessed by ski-plane because the park ski plane got stuck when landing on deep, soft snow in March of 2012. A helicopter will be used to access this station for maintenance in the future. The McArthur Pass RAWS experienced considerable damage from icing and wind between December 2011 and May 2012. The date of damage isn't known because the station lost power and stopped working in early December 2011 due to a faulty solar radiation sensor. The Hickerson Lake RAWS was damaged by wildlife in May 2012. The Fourpeaked RAWS experienced data transmission problems due to a broken GPS antenna cable and a faulty data logger on a separate occasion. This station was maintained twice during the 2012 hydrologic year. A summary of all maintenance work at SWAN operated and maintained weather stations is summarized in Table 7 and described in detail in a complementary report (Lindsay 2012).

### *Measuring Snow and Winter-time Precipitation*

Accurately measuring winter-time precipitation (i.e. snowfall, snow depth, and snow water equivalent) continues to prove difficult to accomplish. Network RAWS rely on unheated tipping buckets, which are only capable of accurately measuring liquid precipitation (e.g. rain). Although sonic snow depth sensors are used at these stations, snow water equivalent is not measured. The sonic snow depth sensors are not performing well at high elevation and coastal weather stations because of the harsh environmental conditions at these sites (condensation develops on the transducer plates). Based on recommendations from NRCS Alaska snow survey staff, SWAN staff installed a Judd sonic snow depth sensor on both coastal and high-elevation weather stations in Kenai Fjords National Park. This sensor performed very well at both locations and it is recommended that Judd sensors be used at all stations in the future when the existing Campbell Scientific sensors are eventually phased out. The sonic snow depth sensors at McArthur Pass and Fourpeaked RAWS were permanently removed due to their poor performance at these locations and the lack of persistent snow cover due to wind transport.

A displacement precipitation gauge (filled with an antifreeze solution) is used at the Harding Icefield RAWS. By design, this gauge is capable of accurately measuring winter-time precipitation. In reality, undercatch (the difference between the actual amount of snow and the amount measured by a precipitation gauge) is a significant problem because of the extremely windy nature of the site. Measured precipitation is only a fraction of the snow water equivalent reflected by the adjacent snowpack (15% over one year - based on detailed snow pit observations made during the 2008 hydrologic year). For these reasons, plans were being made to remove the gauge because it is logistically challenging to maintain. However, discussions with researchers at the International Glaciological Society 2012 meeting and on the Cryolist list serve who operate precipitation gauges at similar locations pointed out that the station is likely providing useful information that is locally (but not regionally) representative and that there isn't a persuasive reason to remove it. At this time there is no immediate plan to remove this gauge from the Harding Icefield.

**Table 7.** Maintenance summary for RAWS operated and maintained by the SWAN during the 2012 hydrologic year. Acronyms are as follows: air temperature - relative humidity (AT/RH), wind speed (WS), wind direction (WD), solar radiation (SR), snow depth (SD), Global Positioning System (GPS) antenna, geostationary operational environmental satellite (GOES) antenna, data logger program (DLP), rain gauge-tipping bucket (RG-TB), soil temperature (ST), and photo-voltaic (PV) panel.

| Station | Date | Maintenance |
|---|---|---|
| Chigmit Mountains | 06/11/2012 | Scheduled maintenance. Replaced AT/RH, WS, WD, RG-TB, and SD sensors. |
| Contact Creek | 06/21/2012 | Scheduled maintenance. Replaced AT/RH, WS, WD, and SD sensors and added second time-lapse camera, battery, and PV. |
| Coville | 06/20/2012 | Scheduled maintenance. Scheduled maintenance. Replaced AT/RH, WS, WD, and SD sensors and added a second time-lapse camera. |
| Fourpeaked | 06/07/2012 | Scheduled maintenance. Replaced AT/RH, WS, and WD sensors. Removed SD sensor. Field-repaired tower. Replaced batteries. |
| Fourpeaked | 07/19/2012 | Unscheduled maintenance. Replaced data logger, GOES transmitter, and GPS antenna. |
| Harding Icefield | 04/25/2012 | Scheduled maintenance. Replaced AT/RH, WS, WD, and SD sensors. Replaced data logger. Added digital-analog module for SD sensor. Serviced all-season precipitation gauge. |
| Hickerson Lake | 07/07/2012 | Scheduled maintenance. Replaced AT/RH, WS, WD, and SD sensors. Replaced GPS. |
| McArthur Pass | 06/05/2012 | Scheduled and unscheduled maintenance. Replaced AT/RH, WS, WD, SR, RG-TB, GOES, GPS, 20-ft mast, wind-sensor support arm, guy lines, and batteries. |
| Pedersen Lagoon | 07/25/2012 | Scheduled maintenance. Replaced AT/RH, WS, WD, and SD sensors. Added digital-analog module for SD sensor. |
| Pfaff Mine | 06/21/2012 | Scheduled maintenance. Replaced AT/RH, WS, WS, RG-TB, and SD sensors. Replaced data logger. Added soil temperature probes (10, 50 cm) and digital-analog module. |
| Snipe Lake | 06/14/2012 | Scheduled maintenance. Replaced AT/RH, WS, WD, and SD sensors. Added second time-lapse camera, battery, and PV. |

Consideration was given regarding installing more all-season precipitation gauges at weather stations in SWAN parks. The author's opinion is that there should be at least one all-season precipitation gauge located within each park, in addition to any that may be available at developed areas (like airports or park headquarters). This somewhat subjective qualification is satisfied at Katmai National Park and Preserve with the Climate Reference Network station that was installed in 2012 at Contact Creek (see below) and at Kenai Fjords National Park with the SNOTEL station that was installed in 2011 at Exit Glacier. Both these stations supplement year-round precipitation data from weather stations located at nearby airports. Year-round precipitation is currently available in Lake Clark National Park and Preserve from the Climate Reference Network station at Port Alsworth and from the daily weather observations made manually at the Telaquana Lake ranger station.

A small, autonomous precipitation gauge (weighing bucket), in combination with an effective windshield, will be installed at Telaquana Lake in Lake Clark. It will supplement the manual observations that are currently made by the volunteers who live there and will provide for an ongoing record should the volunteers depart in the future. Other locations that were considered for locating this type of gauge included the Snipe Lake and Stoney RAWS. The windy nature of the location at Snipe Lake precludes putting a gauge there and access to Stoney RAWS is either by Super Cub or helicopter, which makes maintaining a weighing bucket precipitation gauge not feasible or financially sustainable. There was some discussion about installing a SNOTEL station within or outside the park boundary. Concerns about additional installations in the park, land ownership outside the park, and the combined upfront cost of installation (~$30,000), long term maintenance (~$2,000), and access issues limited further consideration of this proposal.

#### *Relocating Hickerson Lake RAWS*

The Hickerson Lake remote automated weather station was set up in Lake Clark National Park and Preserve in 2008. Two issues are forcing the I&M program to consider moving this station. Repeated damage from wildlife (black bear) has been a reoccurring problem and access is challenging and unsafe. The one mile hike from Hickerson Lake, which is accessed by float plane, across an unstable, lichen- and moss-covered boulder field with a 600 ft elevation gain is challenging with heavy packs, potentially unsafe because of unstable boulders, and definitely unsafe during wet conditions. Helicopter access to the weather station itself is not possible without either using single-skid step-out landings (due to the hazardous nature of these types of landings, they are prohibited without an explicit exemption and additional training) or constructing a helipad, which isn't practical or desired. A ranking process was used to evaluate possible sites for relocating the weather station. Based on the outcome of this process and park preference, the Hickerson Lake weather station will be relocated to a site near Silver Salmon Creek. It is hoped that the existing weather station will continue to operate for approximately one year after the replacement station is in place at Silver Salmon.

#### *Relocating Contact Creek and Fourpeaked RAWS*

SWAN and park staff are also planning to relocate two weather stations in Katmai National Park and Preserve – the Contact Creek and possibly the Fourpeaked RAWS. The new Climate Reference Network (CRN) station at Contact Creek (see below) is collocated with the Contact Creek RAWS that has been operating since 2008. This RAWS will be removed after the new CRN station has operated for one year. Compliance was in place to relocate the Contact Creek RAWS to a site on Dumpling Mountain; however, a reevaluation of that location indicates that it would likely prove unsustainable to the long term operation of a weather station. Existing infrastructure (e.g. radio repeater) at the location is frequently covered in heavy rime ice during winter months which would likely damage the RAWS. Access to the Dumpling Mountain location is either by foot from Brooks Camp (four miles, 2,400 ft elevation gain) or by helicopter and it is likely that helicopter access would be relied upon for transporting equipment. A location near the Three Forks cabin (and NRCS aerial snow marker) at the end of the road that leads from Brooks Camp to the Valley of Ten Thousand Smokes is being evaluated as a possible location for relocating the Contact Creek RAWS.

A few locations on the coast of Katmai National Park and Preserve are also being evaluated as possible locations for relocating the Fourpeaked RAWS. Infrastructure and sensor damage due to winter storms has been problematic at the Fourpeaked weather station, where tower components and sensors have broken two years in a row. This type of damage is costly to repair (requiring a costly two-hour round-trip helicopter ride from Homer for access) and is resulting in a low percentage of valid weather observations. Locations at Cape Gull, Swikshak Lagoon, Kukak Bay, Geographic Harbor, and some privately owned lands will be considered. Site visits, if necessary, will be done in 2013. It is expected that an Environmental Assessment will need to be completed to assess potential impacts from installing a weather station at any newly proposed location in Katmai.

### *McArthur Pass RAWS*

Wind speed and direction sensors are currently mounted on 20 ft (6 m) aluminum masts at network operated RAWS. Experience has shown that these sensors need to be replaced at a higher frequency (every year) than recommended by the manufacturer or the National Interagency Fire Program, which provides standards for the calibration and replacement of sensors. Ice build-up on the anemometer is a common problem at the McArthur Pass RAWS during winter months with false zero wind speeds often reported for two-week intervals (anemometer icing also occurs at the high elevation Chigmit Mountain RAWS). A combination of heavy icing and strong winds has snapped the 6 m aluminum masts on four occasions and also destroyed other sensors. This has occurred three times at McArthur Pass and once at the Harding Icefield RAWS. This type of damage is costly to repair and is resulting in a low percentage of valid weather observations. A proposal was made to either 1) redesign the McArthur Pass RAWS, 2) relocate the McArthur Pass RAWS to either the Dinglestadt or Fire Cove locations (which were evaluated in an Environmental Assessment prepared in 2008), or 3) increase the funding for this weather station by an additional $5,000 per year to cover additional aviation and equipment costs in support of increased maintenance. SWAN and park staff decided to modify the infrastructure and increase the funding for this weather station. A reassessment of the effectiveness of these changes and long-term sustainability of operating the McArthur Pass RAWS will be made in approximately two years.

### *Contact Creek Climate Reference Network Station*

Staff from the National Oceanic and Atmospheric Administration and the SWAN completed installation of a new U.S. Climate Reference Network station at Contact Creek in Katmai National Park and Preserve – 42 miles southeast of King Salmon (Figure 14).

The U.S. Climate Reference Network (CRN**)** consists of over 114 stations developed, deployed, managed, and maintained by the National Oceanic and Atmospheric Administration (NOAA) for the express purpose of detecting the national signal of climate change. The vision of the CRN program is to maintain a sustainable high-quality climate observation network that 50 years from now can with the highest degree of confidence answer the question: *How has the climate of the nation changed over the past 50 years?* These stations were designed with climate science in mind. Three independent measurements of temperature and precipitation are made at each station, insuring continuity of record and maintenance of well-calibrated and highly accurate observations. The stations are placed in pristine environments expected to be free of development for many decades. Stations are monitored and maintained to high standards, and are calibrated on an annual basis. In addition to temperature and precipitation, these stations also measure solar radiation, surface skin temperature, and surface winds, and are being expanded to include triplicate measurements of soil moisture and soil temperature at five depths, as well as atmospheric relative humidity. Experimental stations have been located in Alaska since 2002 and Hawaii since 2005, providing network experience in polar and tropical regions. Deployment of a complete 29 station CRN network into Alaska began in 2009. This project is managed by NOAA's National Climatic Data Center and operated in partnership with NOAA's Atmospheric Turbulence and Diffusion Division. The CRN station at Contact Creek in Katmai National Park and Preserve is the 12$^{th}$ CRN station to be installed in Alaska. The CRN station at Contact Creek is powered by photovoltaic panels and a methanol fuel cell. This station is enclosed within an electric fence in order to mitigate damage from wildlife.

The new CRN station is collocated with a RAWS that the I&M program has operated since 2008. This RAWS will be removed after the new CRN station has operated for one year. More information on the CRN program can be found at http://www.ncdc.noaa.gov/crn/ and current weather observations from the new CRN station at Contact Creek, which is named “AK King Salmon 42 SE”, can be viewed at http://www.ncdc.noaa.gov/crn/station.htm?stationId=1788. Data from the Contact Creek Climate Reference Network station is not included in this report because of the short period of record (five weeks) during the 2012 hydrologic year.

**Figure 14.** CRN station and RAWS collocated at Contact Creek. Station(s) components from left to right are: CRN tipping bucket rain gauge, CRN precipitation gauge with double alter shield, RAWS with wind sensors atop 20 ft mast, CRN instrument tower with wind sensor atop 20 ft tower, CRN solar panels and methanol fuel cell. An electric fence surrounds the station.

### *Summary of Issues Affecting Performance and Data Quality During 2012*

A summary of all known issues affecting the performance and data quality of weather stations maintained and operated by the SWAN during the 2012 hydrologic year is provided in Table 8.

**Table 8.** Issues affecting performance and data quality of RAWS operated and maintained by the SWAN during the 2012 hydrologic year. Acronyms are as follows: air temperature (AT), relative humidity (RH), wind speed (WS), wind direction (WD), snow depth (SD), solar radiation (SR), soil temperature (ST), and rain gauge-tipping bucket (RG-TB).

| Station | Date begin | Date end | Issue |
|---|---|---|---|
| Chigmit Mountains | 12/08/2011 | 01/04/2012 | WD/WS sensors not working (iced-up) |
| Chigmit Mountains | 02/11/2012 | 03/04/2012 | WD/WS sensors not working (iced-up) |
| Chigmit Mountains | 04/16/2012 | 04/25/2012 | WD/WS sensors not working (iced-up) |
| Chigmit Mountains | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Chigmit Mountains | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| Contact Creek | 08/13/2012 | 08/17/2012 | SD sensor obstructed by materials during CRN installation |
| Contact Creek | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Contact Creek | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| Coville | 11/13/2011 | 06/20/2012 | WD sensor lost its fletching (tail) |
| Coville | 06/20/2012 | 07/30/2012 | WD accidentally deactivated in data stream |
| Coville | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Coville | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| Fourpeaked | 02/05/2012 | 06/07/2012 | AT, RH not working (sensor blew away) |
| Fourpeaked | 06/07/2012 | n/a | SD sensor removed, will not be replaced |
| Fourpeaked | 09/02/2012 | 09/30/2012 | Data logger stopped working |
| Fourpeaked | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Fourpeaked | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| Harding Icefield | 04/25/2012 | 04/25/2012 | AT, RH, WS, WD, SD, SR, RG-TB not working – maintenance |
| Harding Icefield | 10/01/2011 | 04/25/2012 | Some artificial spikes in SD data |
| Hickerson Lake | 05/10/2012 | 06/16/2012 | WD/WS sensors not working |
| Hickerson Lake | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Hickerson Lake | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| McArthur Pass | 10/01/2011 | 06/05/2012 | SR sensor not working |
| McArthur Pass | 12/05/2011 | 06/05/2012 | AT, RH, WS, WD, SD, SR, RG-TB not working – no power |
| McArthur Pass | 10/01/2011 | 12/05/2011 | Some artificial spikes in SD data |
| McArthur Pass | 06/05/2012 | n/a | SD sensor removed, will not be replaced |
| McArthur Pass | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| Pedersen Lagoon | 06/01/2011 | 07/25/2012 | SD values reflect growing vegetation |
| Pedersen Lagoon | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Pedersen Lagoon | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| Pfaff Mine | 10/01/2011 | 06/21/2012 | RG-TB upside down – no precipitation data |
| Pfaff Mine | 06/21/2012 | n/a | ST sensors installed (#1-10, #2-50 cm) |
| Pfaff Mine | 07/11/2012 | 09/30/2012 | ST #2 sensor stopped working |
| Pfaff Mine | 06/21/2012 | 09/30/2012 | SD tare value high – subtracted 0.53 inch during data QC |
| Pfaff Mine | 07/28/2012 | 07/28/2012 | AT data spike |
| Pfaff Mine | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Pfaff Mine | 06/21/2012 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |
| Snipe Lake | 06/14/2012 | 09/30/2012 | SD tare value high – subtracted 2.49 inch to zero |
| Snipe Lake | 10/01/2011 | 09/30/2012 | Some artificial spikes in SD data |
| Snipe Lake | 10/01/2011 | 09/30/2012 | Only liquid (e.g. rain) precipitation recorded |

### *Common Reporting and Technical Review*

Although the SWAN’s monitoring objectives and reporting requirements are constrained by the monitoring protocol (Lindsay et al. 2012), significant adjustments to reporting methods and delivery formats should be expected over time. Climate is monitored by all four of the NPS Inventory and Monitoring Networks in Alaska and these networks will consider using a common reporting format in the future. These networks will also be participating in a technical review of their collective climate monitoring efforts.

# Conclusion

The Southwest Alaska Network region was colder than average and received average to above average precipitation during the 2012 hydrologic year (October 2011 through September 2012). Compared to the climatological normal (the prevailing set of weather conditions calculated over a 30-year period, currently 1981-2010), mean annual temperatures for six long-term weather stations were 2.7 to 4.0 °F below average. Total annual precipitation was 108 to 142 % of average. In general, locations in the southern part of the region received above average precipitation whereas locations in the northern part of the region received closer to average precipitation. Several fall and winter months (November, January, and March) and also summer months (May through September) were colder than average across the region. Several historical precipitation records were broken in February and September and record setting snowfall was observed in some locations. When compared to the period of record, temperature and precipitation during the 2012 hydrologic year are generally consistent with colder than average conditions observed during the 2006-2009 and 2011 hydrologic years, but represent a departure from the drier than average conditions generally observed during recent years. Negative (cool phase) Pacific Decadal Oscillation conditions and a La Niña (cool phase) event of the El Niño-Southern Oscillation occurred during the 2012 hydrologic year.

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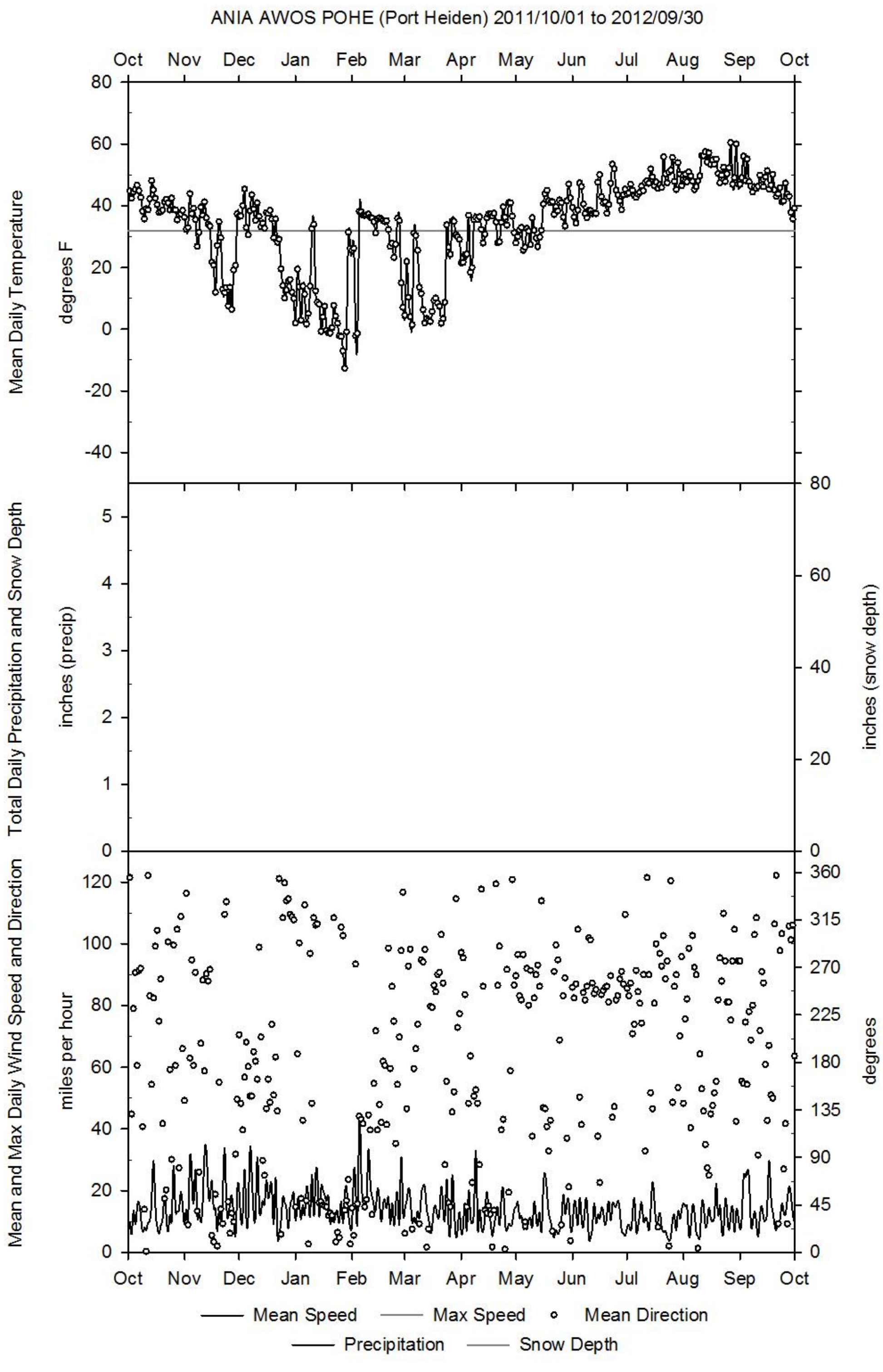
# Appendices - Annual Climate Summaries for 39 Weather Stations

Summary tables and graphs for the most consistently measured climate variables from all weather stations monitored by the SWAN are included in the appendices and are organized by park, climate monitoring program, and station name. Daily measures are used for generating graphs (with the exception of NRCS Snow Courses) and monthly measures are used for generating summary reports. Mean temperature, total precipitation, mean snow depth, mean wind speed and direction, and maximum wind speed are presented in graphs. Minimum, maximum, and mean temperature data, the number of frost days (number of days where the minimum temperature is below freezing), and the number of ice days (number of days where the maximum temperature is below freezing) are included in the summary reports. Total precipitation, average snow depth, mean and maximum wind speed, maximum wind direction, and cumulative solar radiation are also presented in the summary reports. The percentage of valid observations is reported as a measure of the reliability of the derived mean and cumulative values for all reported climate variables. Climatic normal values (arithmetic mean over a 30-year interval) from the NCDC for the 1981-2010 period and period of record (POR) values from the WRCC are included for stations with a long enough observational record. Summary reports and graphs for the Contact Creek CRN are not included in this report because of the short period of record (five weeks) during the 2012 hydrologic year.

For all derived measures, the percentage of valid observations is reported as a measure of the reliability of the derived mean and cumulative values. Monthly measures should not be considered representative of actual climatic conditions if more than 10% (three days) of observations are missing or suspect. Yearly measures should not be considered representative if more than 17% (five days) are missing from any month.

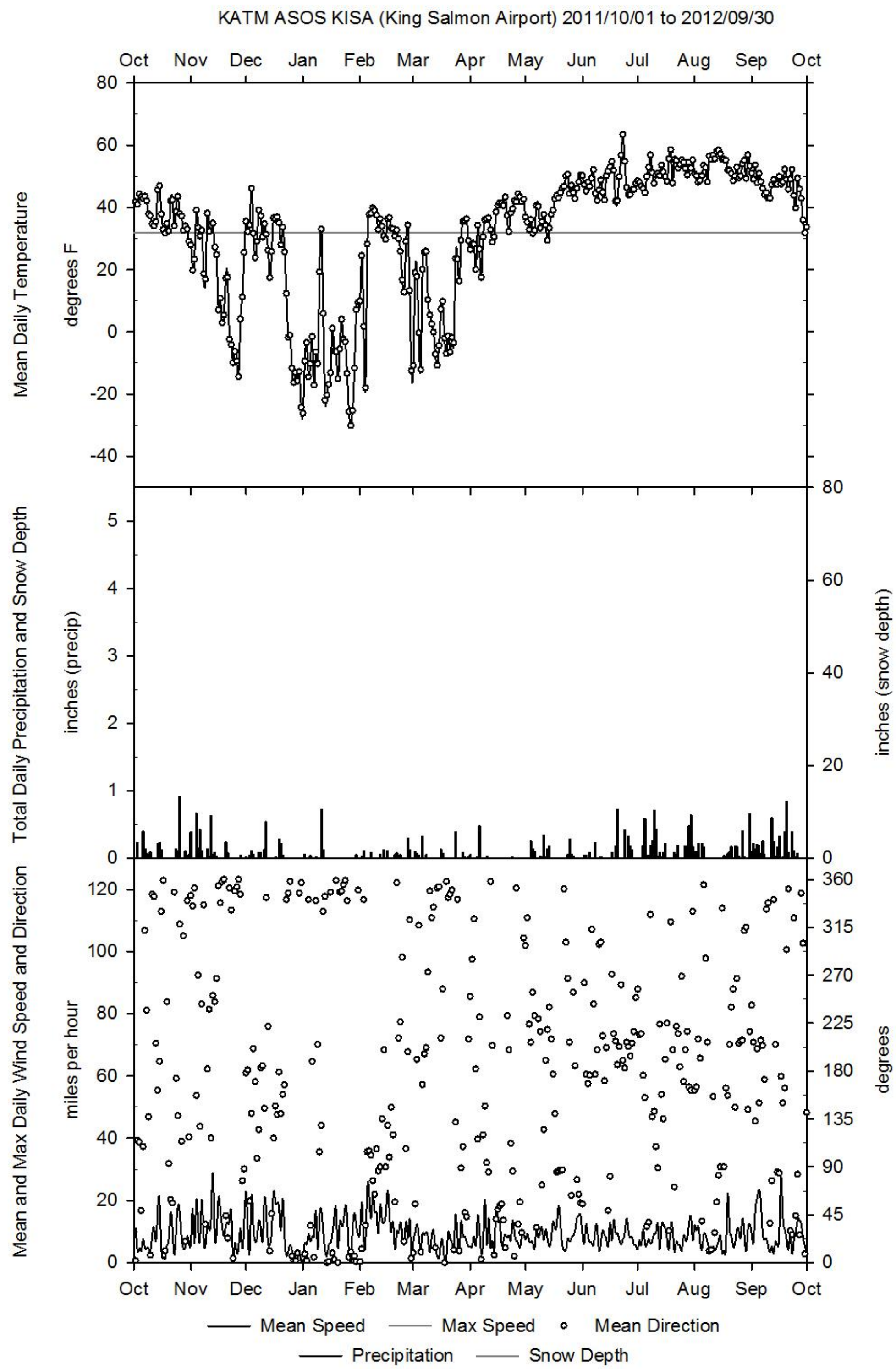
All data used in this report are available upon request from the SWAN. Station data is available in a standardized format - summarized at hourly (where available), daily, and monthly intervals in both metric and U.S. customary units.

| 2012 Hydrologic Year - ANIA AWOS POHE (Port Heiden) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 27 | 1 | -7 | -18 | -17 | -6 | 3 | 16 | 29 | 35 | 39 | 31 | -18 |
| Max. | 45 | 37 | 42 | 27 | 37 | 33 | 37 | 43 | 46 | 52 | 54 | 48 | 54 |
| Mean | 35.6 | 21.5 | 23.5 | 1.0 | 24.3 | 10.2 | 27.4 | 31.1 | 37.1 | 43.6 | 46.7 | 40.2 | 28.5 |
| # days <32 F | 10 | 22 | 21 | 31 | 15 | 30 | 20 | 17 | 2 | 0 | 0 | 1 | 169 |
| % valid obs | 100 | 100 | 100 | 99 | 99 | 98 | 98 | 99 | 99 | 100 | 100 | 99 | 99 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 39 | 16 | 9 | -9 | 9 | 4 | 25 | 28 | 36 | 45 | 48 | 37 | -9 |
| Max | 53 | 53 | 51 | 41 | 45 | 38 | 54 | 53 | 64 | 68 | 72 | 64 | 72 |
| Mean | 45.3 | 33.4 | 32.9 | 15.4 | 33.7 | 20.2 | 38.7 | 40.5 | 47.3 | 52.7 | 57.4 | 50.5 | 39.0 |
| # days <32 F | 0 | 11 | 9 | 26 | 5 | 21 | 4 | 3 | 0 | 0 | 0 | 0 | 79 |
| % valid obs | 100 | 100 | 100 | 99 | 99 | 98 | 98 | 99 | 99 | 100 | 100 | 99 | 99 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 40.7 | 27.5 | 29.1 | 8.3 | 28.6 | 15.4 | 32.5 | 36.0 | 42.0 | 47.8 | 51.4 | 45.8 | 33.8 |
| % valid obs | 100 | 100 | 100 | 99 | 99 | 98 | 98 | 99 | 99 | 100 | 100 | 99 | 99 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 12.7 | 17.7 | 16.3 | 15.4 | 18.3 | 13.7 | 12.4 | 11.6 | 11.8 | 10.8 | 11.4 | 14.7 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 100 | 100 | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

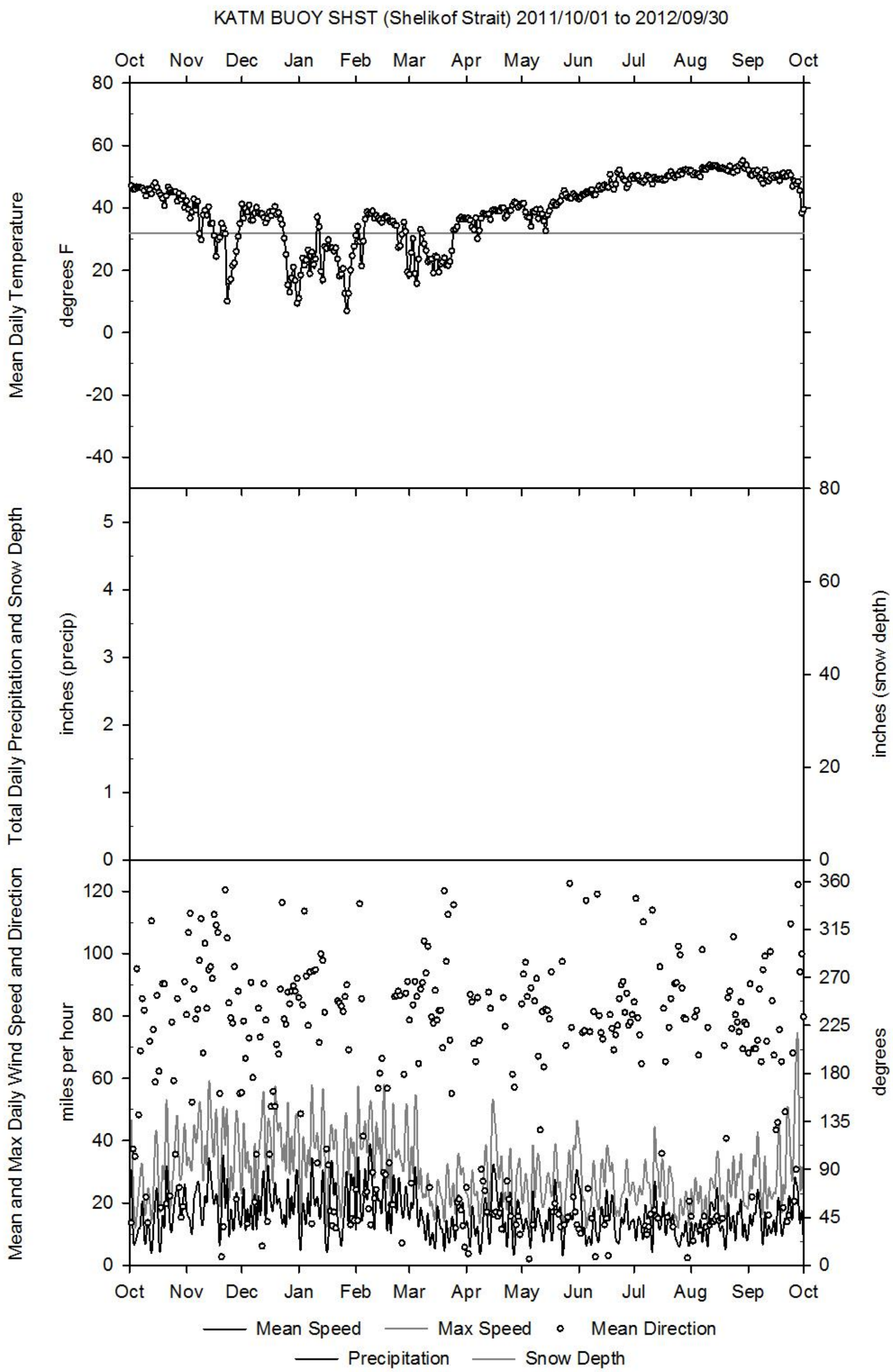


ANIA AWOS POHE (Port Heiden) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM ASOS KISA (King Salmon Airport) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 20 | -25 | -31 | -40 | -30 | -26 | 10 | 23 | 34 | 41 | 34 | 22 | -40 |
| Max. | 42 | 34 | 39 | 27 | 38 | 34 | 37 | 45 | 51 | 52 | 51 | 49 | 52 |
| Mean | 30.2 | 8.0 | 11.8 | -15.6 | 18.1 | -0.7 | 27.1 | 32.8 | 39.7 | 45.8 | 44.9 | 38.6 | 23.4 |
| # days <32 F | 17 | 29 | 24 | 31 | 21 | 30 | 23 | 13 | 0 | 0 | 0 | 6 | 194 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 35 | -6 | -17 | -18 | -5 | -2 | 24 | 35 | 44 | 46 | 52 | 43 | -18 |
| Max | 53 | 43 | 50 | 37 | 42 | 44 | 60 | 62 | 77 | 72 | 72 | 60 | 77 |
| Mean | 45.0 | 23.2 | 23.9 | 2.9 | 30.6 | 20.0 | 43.8 | 49.3 | 58.0 | 58.3 | 60.9 | 52.4 | 39.0 |
| # days <32 F | 0 | 19 | 14 | 29 | 9 | 23 | 3 | 0 | 0 | 0 | 0 | 0 | 97 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 37.8 | 16.5 | 18.1 | -6.5 | 25.3 | 11.0 | 35.7 | 41.0 | 48.3 | 51.7 | 52.9 | 46.0 | 31.5 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 3.25 | 2.68 | 1.64 | 1.02 | 1.12 | 1.35 | 0.56 | 1.62 | 2.47 | 4.77 | 2.64 | 4.38 | 27.50 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 7.9 | 12.0 | 9.6 | 9.8 | 13.0 | 7.1 | 8.9 | 9.3 | 8.4 | 8.3 | 8.0 | 10.0 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

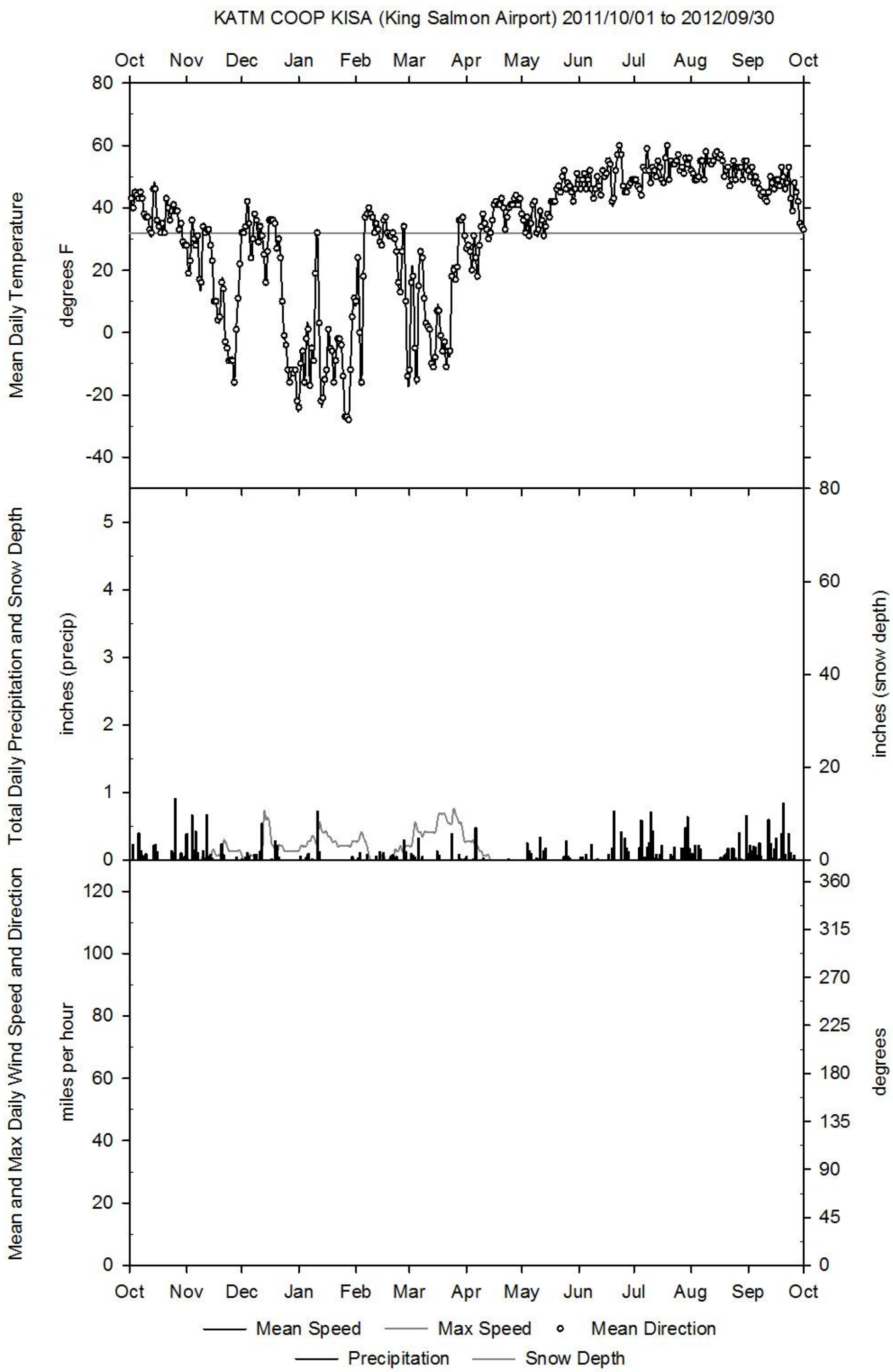

KATM ASOS KISA (King Salmon Airport) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80 60 40 20 0 -20 -40
Total Daily Precipitation and Snow Depth
inches (precip)
5 4 3 2 1 0
inches (snow depth)
80 60 40 20 0
Mean and Max Daily Wind Speed and Direction
miles per hour
120 100 80 60 40 20 0
degrees
360 315 270 225 180 135 90 45 0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM BUOY SHST (Shelikof Strait) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 37.0 | 5.7 | 6.8 | 5.9 | 14.5 | 9.7 | 27.5 | 30.0 | 41.5 | 46.2 | 48.6 | 34.5 | 5.7 |
| Max. | 46.0 | 39.6 | 38.8 | 32.2 | 37.8 | 35.8 | 39.9 | 43.9 | 50.7 | 51.6 | 53.1 | 51.1 | 53.1 |
| Mean | 43.0 | 28.2 | 29.4 | 19.7 | 30.3 | 24.1 | 36.3 | 38.6 | 45.7 | 48.9 | 51.2 | 46.8 | 36.9 |
| # days <32 F | 0 | 18 | 9 | 30 | 11 | 25 | 4 | 2 | 0 | 0 | 0 | 0 | 99 |
| % valid obs | 100 | 99 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 99 | 97 | 99 | 99 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 42.6 | 18.7 | 13.1 | 8.1 | 19.9 | 20.5 | 34.0 | 34.7 | 44.2 | 48.9 | 51.6 | 41.9 | 8.1 |
| Max | 49.5 | 46.4 | 45.9 | 40.5 | 40.1 | 39.0 | 46.8 | 47.8 | 54.3 | 55.9 | 59.5 | 54.9 | 59.5 |
| Mean | 46.9 | 36.1 | 35.0 | 26.7 | 35.7 | 30.0 | 40.1 | 42.2 | 49.3 | 51.6 | 54.2 | 51.3 | 41.6 |
| # days <32 F | 0 | 7 | 8 | 25 | 5 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| % valid obs | 100 | 99 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 99 | 97 | 99 | 99 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 44.9 | 32.1 | 32.0 | 23.2 | 33.3 | 26.9 | 37.9 | 40.3 | 47.1 | 50.0 | 52.5 | 49.0 | 39.1 |
| % valid obs | 100 | 99 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 99 | 97 | 99 | 99 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 15.8 | 19.5 | 19.8 | 19.1 | 22.1 | 14.3 | 15.2 | 15.4 | 13.9 | 12.8 | 13.4 | 15.8 | |
| % valid obs | 100 | 99 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 99 | 97 | 99 | |
| Max speed | 52.6 | 57.3 | 56.4 | 57.7 | 56.8 | 51.5 | 51.5 | 46.5 | 36.9 | 43.6 | 36.0 | 70.2 | 70.2 |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |


KATM BUOY SHST (Shelikof Strait) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM COOP KISA (King Salmon Airport) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 20 | -25 | -31 | -40 | -31 | -27 | 9 | 22 | 32 | 40 | 32 | 19 | -40 |
| Max. | 41 | 28 | 34 | 27 | 37 | 33 | 36 | 45 | 51 | 51 | 50 | 49 | 51 |
| Mean | 29.5 | 7.1 | 10.9 | -17.0 | 17.4 | -1.8 | 26.3 | 32.3 | 39.3 | 45.5 | 44.2 | 38.1 | 22.6 |
| # days <32 F | 17 | 30 | 24 | 31 | 22 | 30 | 23 | 15 | 0 | 0 | 0 | 6 | 198 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 35 | -6 | -16 | -17 | -4 | -2 | 24 | 35 | 44 | 47 | 52 | 44 | -17 |
| Max | 53 | 44 | 51 | 37 | 42 | 45 | 61 | 62 | 78 | 73 | 73 | 60 | 78 |
| Mean | 45.6 | 23.5 | 24.4 | 3.5 | 31.1 | 20.5 | 44.4 | 50.0 | 58.7 | 59.1 | 61.7 | 53.4 | 39.7 |
| # days <32 F | 0 | 19 | 12 | 29 | 8 | 22 | 3 | 0 | 0 | 0 | 0 | 0 | 93 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 37.8 | 15.2 | 17.7 | -6.6 | 24.2 | 9.4 | 35.4 | 41.1 | 49.1 | 52.4 | 53.0 | 45.7 | 31.2 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 33.4 | 22.6 | 15.6 | 14.5 | 17.2 | 21.9 | 32.6 | 43.3 | 50.7 | 55 | 54.2 | 47.4 | 34 |
| 1981-2010 | 33.5 | 22.9 | 18.6 | 16.2 | 18.8 | 24.1 | 33.7 | 44.2 | 51.5 | 55.5 | 54.6 | 47.6 | 35.2 |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 3.26 | 2.73 | 1.65 | 1.12 | 1.13 | 1.35 | 0.56 | 1.63 | 2.47 | 4.77 | 2.65 | 4.38 | 27.69 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 2.09 | 1.47 | 1.25 | 1.01 | 0.77 | 0.87 | 1.01 | 1.31 | 1.63 | 2.31 | 3.02 | 3.01 | 19.76 |
| 1981-2010 | 2.08 | 1.39 | 1.23 | 1.02 | 0.76 | 0.70 | 0.97 | 1.25 | 1.65 | 2.30 | 2.95 | 3.19 | 19.49 |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 1.0 | 2.0 | 4.0 | 2.0 | 7.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| POR mean[1] | 0 | 1 | 2 | 3 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

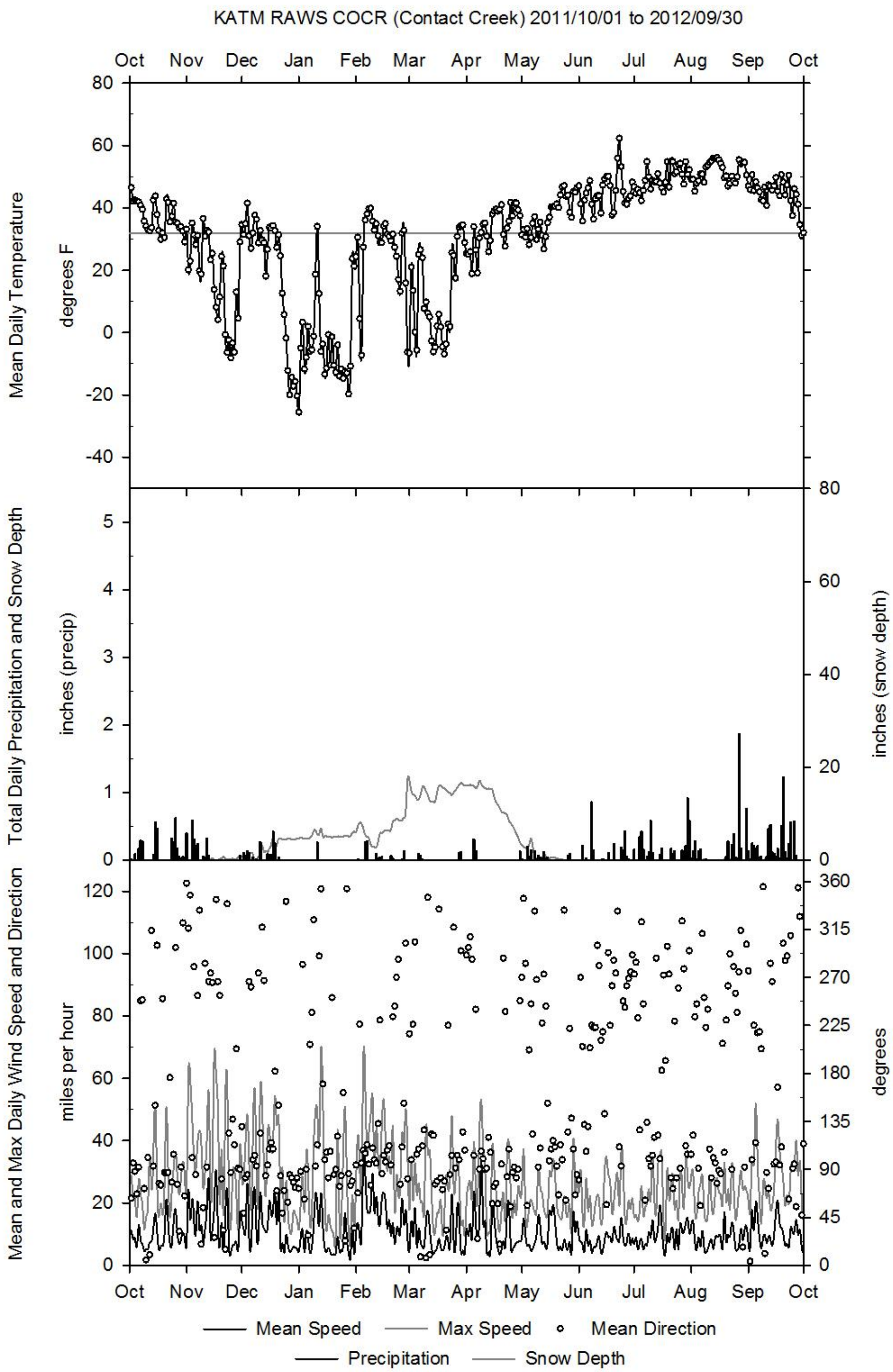
[1]Period of record used: 07/01/1955 to 09/30/2012



KATM COOP KISA (King Salmon Airport) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80 60 40 20 0 -20 -40
Total Daily Precipitation and Snow Depth
inches (precip)
5 4 3 2 1 0
inches (snow depth)
80 60 40 20 0
Mean and Max Daily Wind Speed and Direction
miles per hour
120 100 80 60 40 20 0
degrees
360 315 270 225 180 135 90 45 0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM RAWS COCR (Contact Creek) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 18.3 | -14.3 | -30.1 | -33.0 | -19.1 | -17.3 | 6.3 | 19.8 | 28.0 | 32.2 | 36.1 | 21.0 | -33.0 |
| Max. | 39.9 | 31.6 | 37.6 | 28.4 | 36.5 | 31.5 | 34.5 | 41.7 | 46.9 | 48.6 | 50.7 | 47.3 | 50.7 |
| Mean | 29.1 | 8.5 | 11.4 | -12.1 | 18.9 | 1.2 | 25.4 | 30.7 | 35.6 | 42.6 | 43.5 | 37.3 | 22.6 |
| # days <32 F | 20 | 30 | 28 | 31 | 23 | 31 | 24 | 17 | 4 | 0 | 0 | 6 | 214 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 36.7 | -2.9 | -18.2 | -11.0 | 5.4 | 6.3 | 30.7 | 32.0 | 38.8 | 46.4 | 47.7 | 40.6 | -18.2 |
| Max | 54.9 | 40.3 | 44.2 | 37.2 | 45.7 | 53.4 | 59.9 | 59.4 | 75.2 | 72.5 | 70.3 | 57.0 | 75.2 |
| Mean | 44.6 | 24.6 | 23.1 | 7.9 | 32.4 | 25.2 | 43.1 | 46.2 | 54.9 | 56.3 | 59.4 | 50.9 | 39.1 |
| # days <32 F | 0 | 19 | 16 | 29 | 9 | 21 | 2 | 0 | 0 | 0 | 0 | 0 | 96 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 36.9 | 17.5 | 17.6 | -2.2 | 25.6 | 12.1 | 33.4 | 37.9 | 45.1 | 49.5 | 51.4 | 44.3 | 30.7 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 3.92 | 1.92 | 1.72 | 0.26 | 1.03 | 0.42 | 0.61 | 1.05 | 2.66 | 4.46 | 4.74 | 5.81 | 28.60 |
| % valid obs | 84 | 26 | 39 | 4 | 53 | 16 | 71 | 83 | 100 | 100 | 100 | 96 | 64 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 0.2 | 2.8 | 5.3 | 7.2 | 14.7 | 12.0 | 0.8 | 0.0 | 0.1 | 0.1 | 0.1 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 69 | 0 | 16 | 25 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 9.4 | 13.7 | 12.3 | 8.8 | 16.2 | 9.3 | 10.8 | 9.5 | 8.0 | 9.7 | 8.7 | 10.6 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | 51.5 | 68.0 | 56.2 | 69.4 | 67.6 | 47.9 | 53.0 | 40.7 | 36.5 | 35.3 | 32.9 | 51.9 | 69.4 |
| Max direction | 127 | 21 | 116 | 324 | 118 | 116 | 120 | 123 | 117 | 129 | 132 | 89 | 324 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 45.8 | 20.8 | 9.2 | 19.5 | 37.7 | 107.2 | 142.6 | 156.2 | 139.0 | 112.2 | 99.5 | 54.9 | 944.6 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

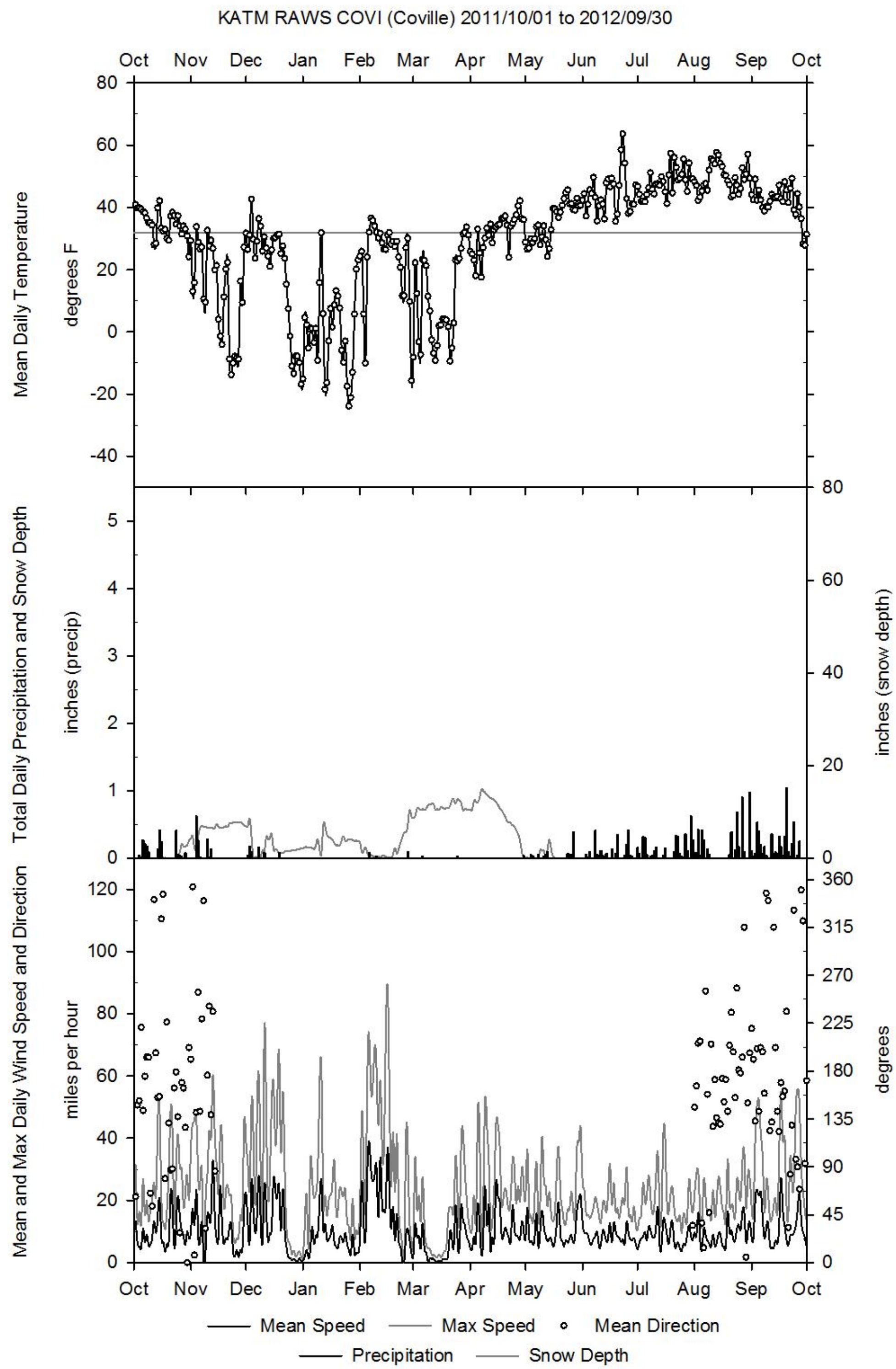
[2] Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.



KATM RAWS COCR (Contact Creek) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM RAWS COVI (Coville) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 15.8 | -17.9 | -20.9 | -27.2 | -23.8 | -16.6 | 6.3 | 19.0 | 30.7 | 36.1 | 39.7 | 23.7 | -27.2 |
| Max. | 38.3 | 27.3 | 37.2 | 26.4 | 34.2 | 27.9 | 37.9 | 38.7 | 55.2 | 49.8 | 49.5 | 45.9 | 55.2 |
| Mean | 29.7 | 6.3 | 13.0 | -7.3 | 16.2 | 4.1 | 25.4 | 29.8 | 37.9 | 42.7 | 43.9 | 36.5 | 23.2 |
| # days <32 F | 18 | 30 | 30 | 31 | 27 | 31 | 23 | 17 | 2 | 0 | 0 | 5 | 214 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 31.1 | -9.9 | -9.2 | -15.7 | -1.1 | -4.5 | 26.1 | 31.1 | 37.9 | 45.1 | 43.7 | 32.5 | -15.7 |
| Max | 49.1 | 39.6 | 45.1 | 35.6 | 39.4 | 44.4 | 48.2 | 54.1 | 73.9 | 68.4 | 67.8 | 55.9 | 73.9 |
| Mean | 40.4 | 20.7 | 23.1 | 10.2 | 29.2 | 19.7 | 39.1 | 42.7 | 52.2 | 54.6 | 56.2 | 47.5 | 36.3 |
| # days <32 F | 2 | 22 | 17 | 30 | 14 | 22 | 4 | 1 | 0 | 0 | 0 | 0 | 112 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 34.7 | 13.4 | 17.6 | 1.2 | 22.3 | 11.0 | 31.9 | 35.8 | 44.5 | 48.0 | 49.3 | 41.5 | 29.3 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 2.23 | 1.34 | 0.65 | 0.00 | 0.21 | 0.06 | 0.05 | 0.90 | 2.37 | 3.58 | 4.97 | 5.16 | 21.52 |
| % valid obs | 79 | 15 | 21 | 2 | 32 | 12 | 65 | 75 | 100 | 100 | 100 | 93 | 58 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.7 | 6.5 | 2.3 | 3.6 | 2.5 | 11.1 | 9.5 | 0.5 | 0.0 | | | | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 65 | 0 | 0 | 0 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 10.1 | 11.3 | 11.7 | 7.8 | 16.9 | 6.0 | 11.4 | 10.3 | 8.3 | 8.7 | 9.2 | 12.2 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | 50.3 | 60.4 | 75.2 | 62.2 | 88.8 | 42.5 | 52.1 | 43.6 | 31.5 | 41.4 | 35.3 | 55.7 | 88.8 |
| Max direction | 132 | | | | | | | | | | 218 | 98 | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 45.7 | 18.0 | 7.7 | 13.7 | 34.1 | 92.9 | 142.0 | 171.1 | 138.8 | 115.4 | 96.1 | 54.5 | 929.9 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

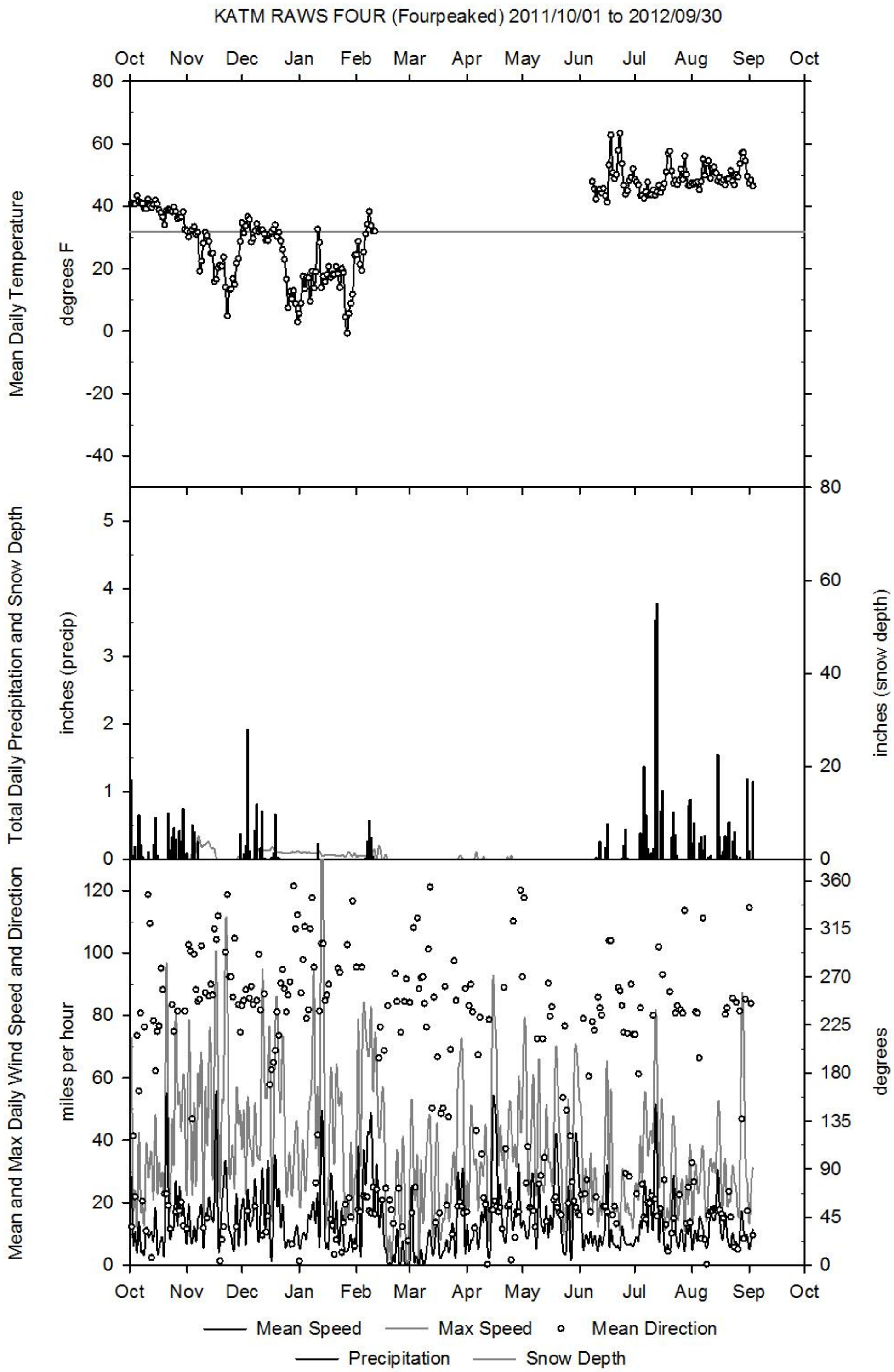
[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.



KATM RAWS COVI (Coville) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM RAWS FOUR (Fourpeaked) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 28.4 | -5.3 | 0.0 | -4.2 | 14.4 | | | | 38.8 | 41.2 | 43.3 | 43.9 | -5.3 |
| Max. | 39.9 | 31.5 | 33.1 | 29.1 | 35.2 | | | | 58.6 | 50.2 | 51.8 | 44.6 | 58.6 |
| Mean | 35.9 | 18.0 | 22.4 | 11.3 | 26.2 | | | | 44.4 | 44.5 | 47.0 | 44.3 | 31.4 |
| # days <32 F | 4 | 30 | 29 | 31 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| % valid obs | 100 | 100 | 100 | 100 | 28 | 0 | 0 | 0 | 78 | 100 | 100 | 7 | 60 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 36.5 | 12.9 | 8.1 | 3.6 | 26.6 | | | | 42.3 | 43.7 | 46.6 | 49.5 | 3.6 |
| Max | 48.9 | 38.3 | 40.6 | 35.8 | 41.5 | | | | 70.5 | 67.8 | 63.1 | 56.1 | 70.5 |
| Mean | 42.6 | 28.5 | 29.3 | 21.4 | 33.6 | | | | 54.3 | 51.8 | 54.5 | 52.8 | 39.8 |
| # days <32 F | 0 | 19 | 13 | 29 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 |
| % valid obs | 100 | 100 | 100 | 100 | 30 | 0 | 0 | 0 | 78 | 100 | 100 | 7 | 60 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 38.9 | 23.5 | 25.6 | 16.4 | 29.1 | | | | 49.0 | 47.6 | 50.2 | 47.4 | 35.3 |
| % valid obs | 100 | 100 | 100 | 100 | 29 | 0 | 0 | 0 | 78 | 100 | 100 | 7 | 60 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 6.72 | 1.54 | 5.32 | 0.24 | 1.21 | | | | 1.72 | 15.49 | 6.70 | 1.14 | 40.08 |
| % valid obs | 97 | 24 | 44 | 4 | 14 | 0 | 0 | 0 | 78 | 99 | 100 | 7 | 39 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 1.3 | 1.4 | 1.1 | 0.4 | 0.0 | 0.1 | 0.0 | 0.0 | | | | |
| % valid obs | 98 | 100 | 96 | 99 | 86 | 99 | 98 | 100 | 20 | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 13.2 | 16.4 | 15.2 | 13.7 | 14.6 | 9.1 | 17.3 | 17.9 | 9.0 | 14.2 | 11.5 | 9.6 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 7 | |
| Max speed | 96.6 | 106.7 | 94.4 | 136.0 | 84.1 | 72.7 | 90.8 | 77.2 | 64.4 | 78.7 | 82.3 | 31.1 | 136.0 |
| Max direction | 54 | 301 | 266 | 305 | 62 | 64 | 58 | 309 | 56 | 57 | 288 | 61 | 305 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 39.6 | 19.3 | 8.0 | 14.6 | 30.3 | 86.3 | 114.0 | 130.1 | 194.5 | 126.9 | 113.7 | 6.6 | 883.7 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 7 | 92 |

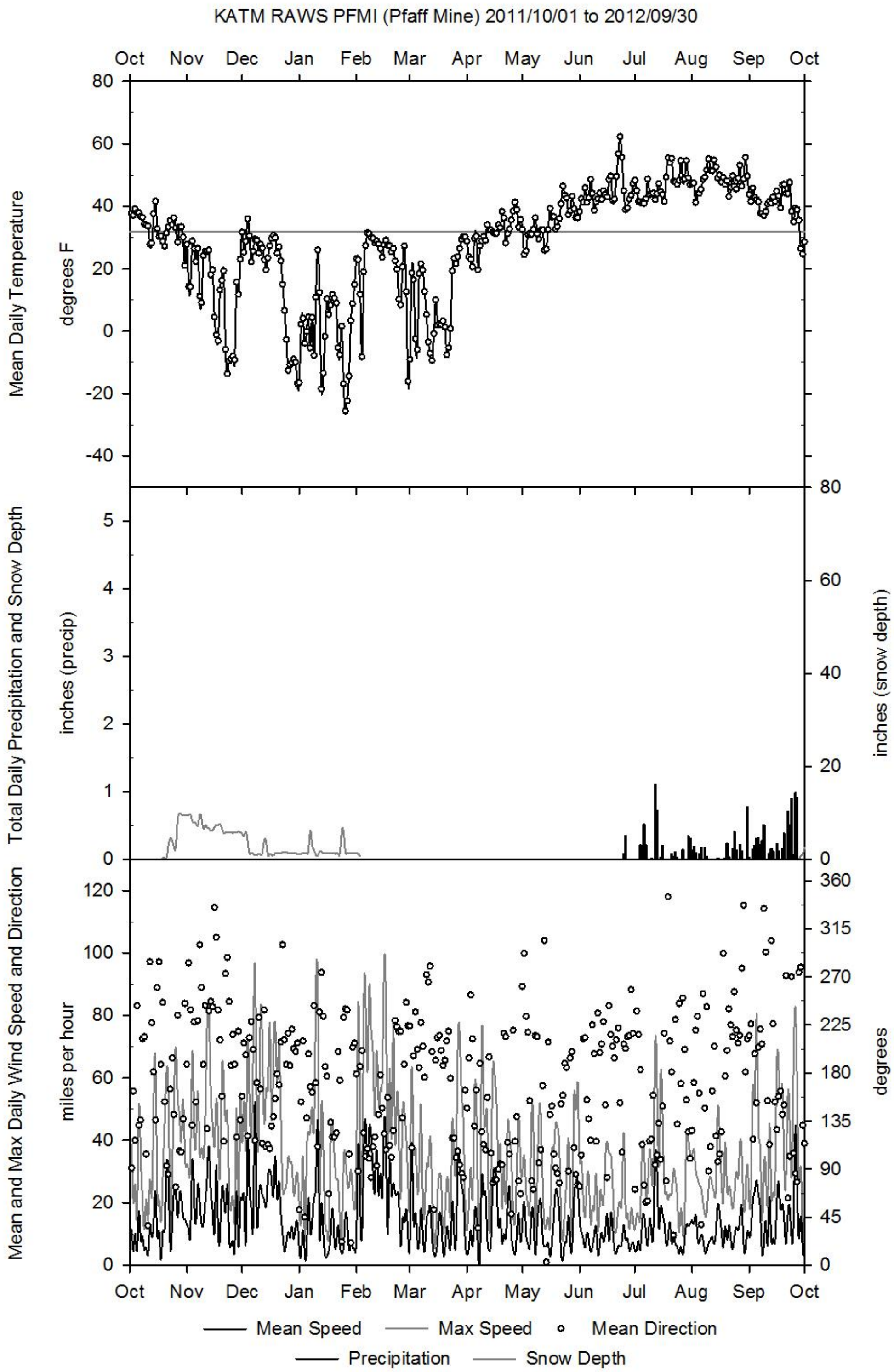
[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.



KATM RAWS FOUR (Fourpeaked) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM RAWS PFMI (Pfaff Mine) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 16.3 | -17.3 | -19.8 | -28.8 | -21.1 | -15.0 | 10.2 | 19.0 | 33.6 | 37.2 | 36.3 | 21.4 | -28.8 |
| Max. | 37.0 | 23.9 | 31.8 | 19.4 | 30.2 | 28.0 | 34.5 | 38.8 | 53.6 | 47.5 | 49.1 | 44.4 | 53.6 |
| Mean | 29.3 | 6.2 | 11.8 | -6.9 | 14.7 | 4.5 | 25.9 | 30.0 | 39.6 | 42.0 | 43.1 | 34.9 | 22.9 |
| # days <32 F | 19 | 30 | 31 | 31 | 29 | 31 | 26 | 19 | 0 | 0 | 0 | 8 | 224 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 99 | 99 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 25.2 | -9.4 | -12.8 | -23.1 | -8.5 | -4.4 | 26.6 | 29.3 | 43.0 | 43.0 | 43.7 | 28.2 | -23.1 |
| Max | 44.8 | 35.1 | 43.9 | 32.9 | 32.9 | 43.2 | 54.1 | 62.4 | 69.3 | 65.8 | 66.6 | 53.6 | 69.3 |
| Mean | 37.6 | 18.7 | 20.5 | 9.7 | 26.1 | 17.9 | 39.2 | 42.8 | 52.3 | 52.8 | 55.5 | 45.7 | 34.9 |
| # days <32 F | 3 | 28 | 24 | 29 | 23 | 26 | 3 | 1 | 0 | 0 | 0 | 2 | 139 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 33.1 | 12.3 | 16.0 | 0.9 | 20.3 | 10.5 | 31.5 | 34.8 | 45.2 | 46.8 | 48.6 | 39.9 | 28.3 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2]* | | | | | | | | | 0.45 | 4.27 | 2.90 | 7.49 | 15.11 |
| % valid obs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 100 | 100 | 88 | 27 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 2.4 | 6.9 | 1.8 | 1.8 | 1.1 | 0.5 | | | 0.0 | 0.0 | 0.0 | 0.2 | |
| % valid obs | 100 | 100 | 100 | 98 | 3 | 0 | 0 | 0 | 33 | 99 | 100 | 100 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 13.3 | 18.1 | 19.5 | 11.2 | 25.7 | 13.7 | 13.6 | 12.5 | 8.3 | 11.6 | 10.1 | 15.6 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | 69.8 | 81.9 | 96.2 | 87.2 | 96.0 | 74.5 | 75.2 | 58.6 | 42.5 | 70.9 | 50.3 | 82.6 | 96.2 |
| Max direction | 90 | 231 | 110 | 119 | 93 | 114 | 129 | 75 | 127 | 101 | 110 | 67 | 110 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 45.0 | 17.8 | 8.5 | 16.5 | 40.1 | 99.5 | 158.4 | 197.2 | 169.8 | 134.7 | 115.4 | 58.0 | 1060.9 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

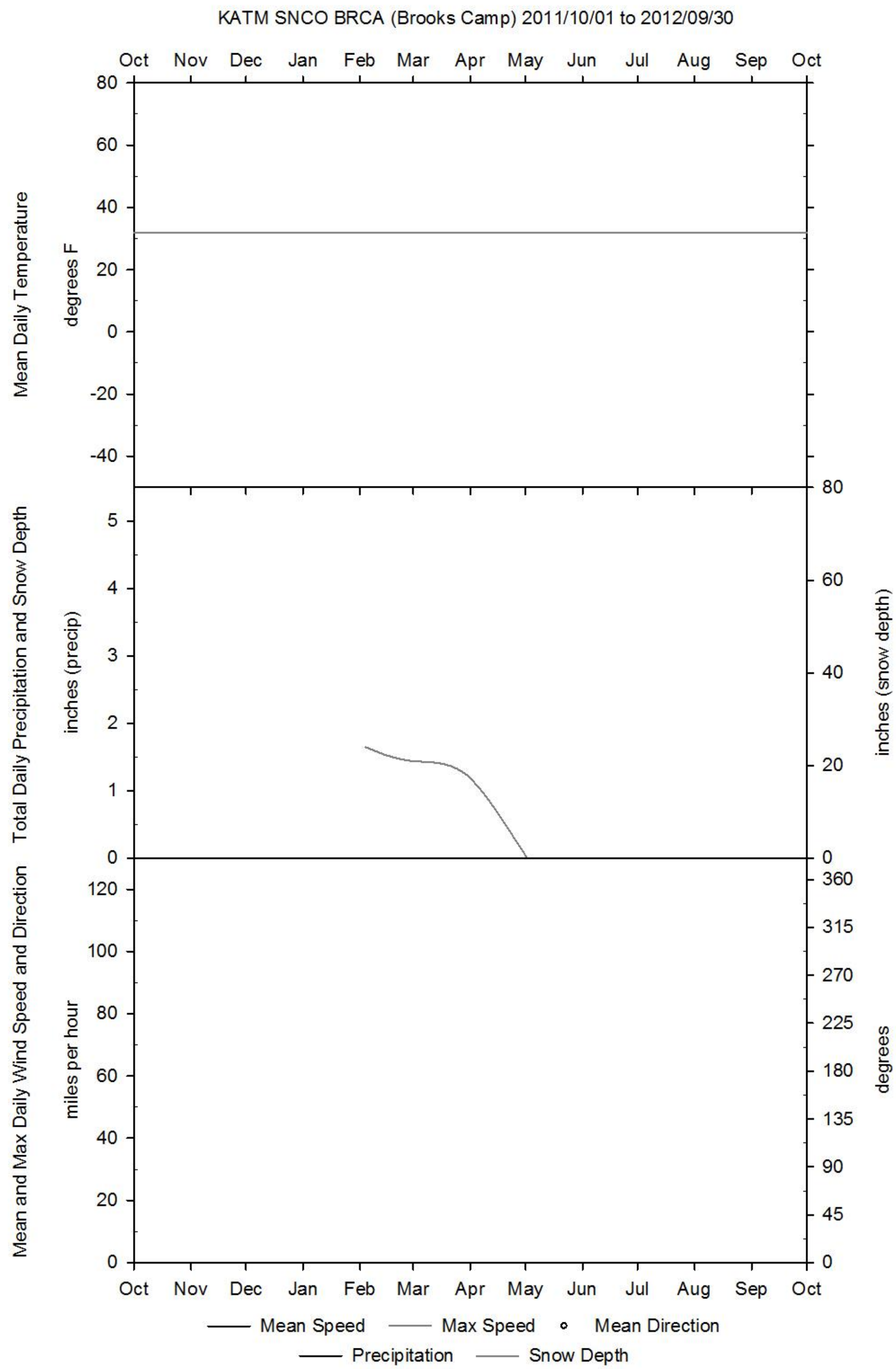
[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.
*Precipitation gauge was not working 10/01/2011 to 06/21/2012.



KATM RAWS PFMI (Pfaff Mine) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80 60 40 20 0 -20 -40
Total Daily Precipitation and Snow Depth
inches (precip)
5 4 3 2 1 0
inches (snow depth)
80 60 40 20 0
Mean and Max Daily Wind Speed and Direction
miles per hour
120 100 80 60 40 20 0
degrees
360 315 270 225 180 135 90 45 0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM SNCO BRCA (Brooks Camp) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | | | | | | | |
| Max. | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | | | | | | | |
| Max | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[3] | | | | 4.7 | 5.5 | 6.0 | 0.0 | | | | | | |
| % valid obs | | 0 | 0 | 100 | 100 | 100 | 100 | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010[5] | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average[4] | | | | 24 | 21 | 18 | 0 | | | | | | |
| % valid obs | | 0 | 0 | 100 | 100 | 100 | 100 | | | | | | |
| 1981-2010[5] | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

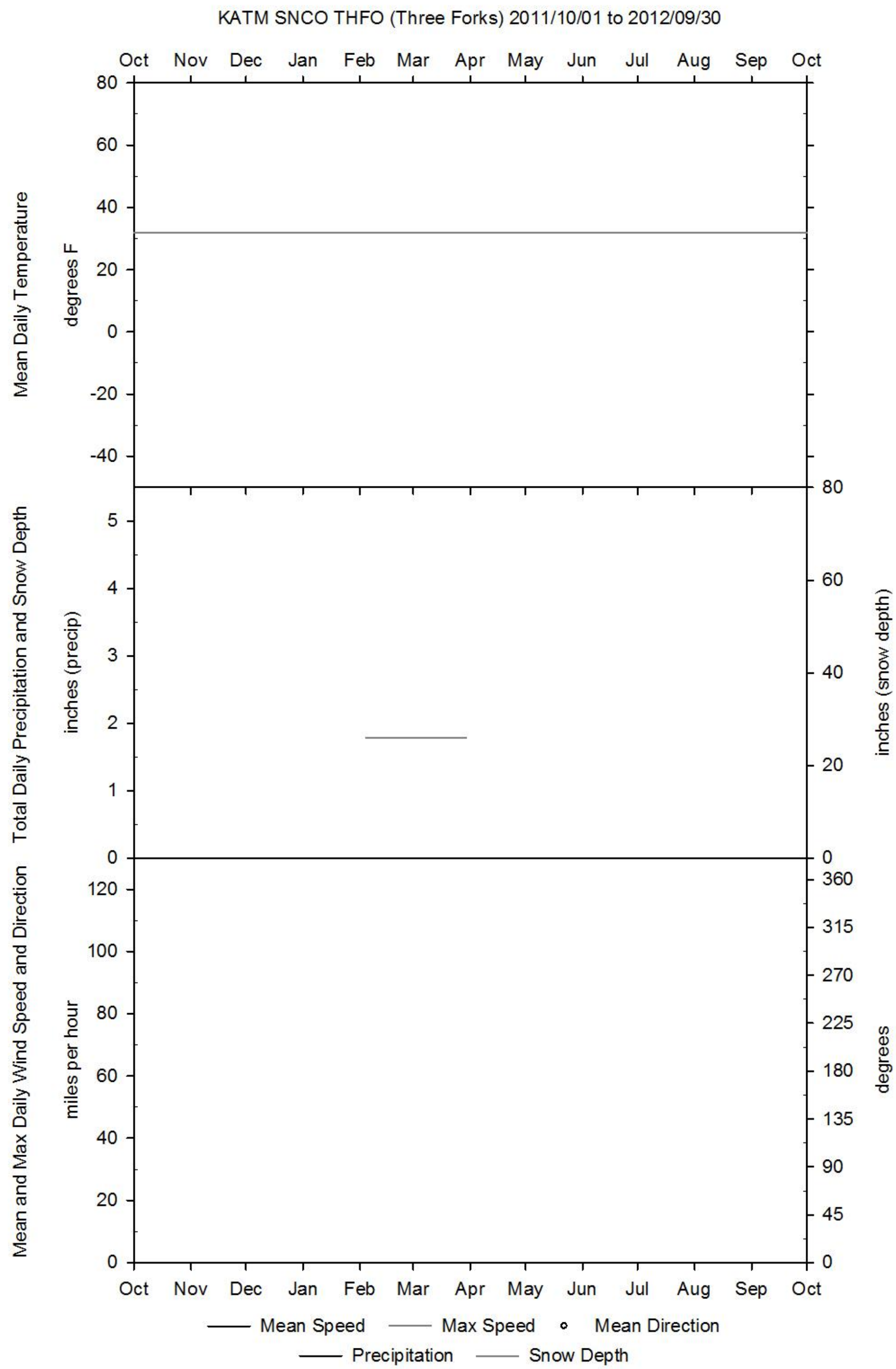
[3] Snow water equivalent measured close to the end of the month listed.
[4] Cummulative snow depth measured close to the end of the month listed.
[5] Values are not available for this snow course.



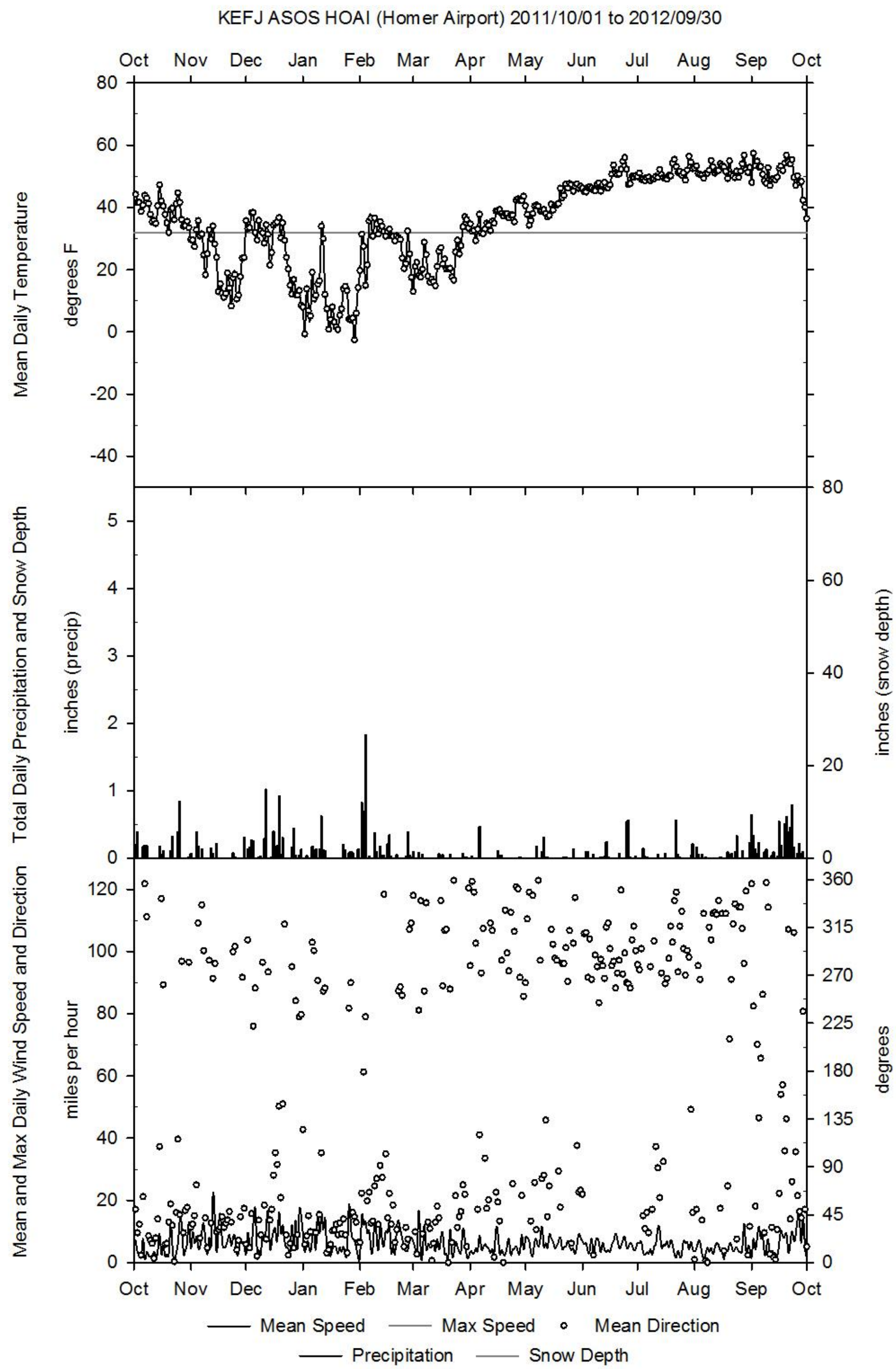
KATM SNCO BRCA (Brooks Camp) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80 60 40 20 0 -20 -40
Total Daily Precipitation and Snow Depth
inches (precip)
5 4 3 2 1 0
inches (snow depth)
80 60 40 20 0
Mean and Max Daily Wind Speed and Direction
miles per hour
120 100 80 60 40 20 0
degrees
360 315 270 225 180 135 90 45 0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KATM SNCO THFO (Three Forks) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | | | | | | | |
| Max. | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | | | | | | | |
| Max | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[3] | | | | 5.1 | 6.2 | 7.8 | | | | | | | |
| % valid obs | | 0 | 0 | 100 | 100 | 100 | 0 | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010[5] | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average[4] | | | | 26 | 26 | 26 | | | | | | | |
| % valid obs | | 0 | 0 | 100 | 100 | 100 | 0 | | | | | | |
| 1981-2010[5] | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

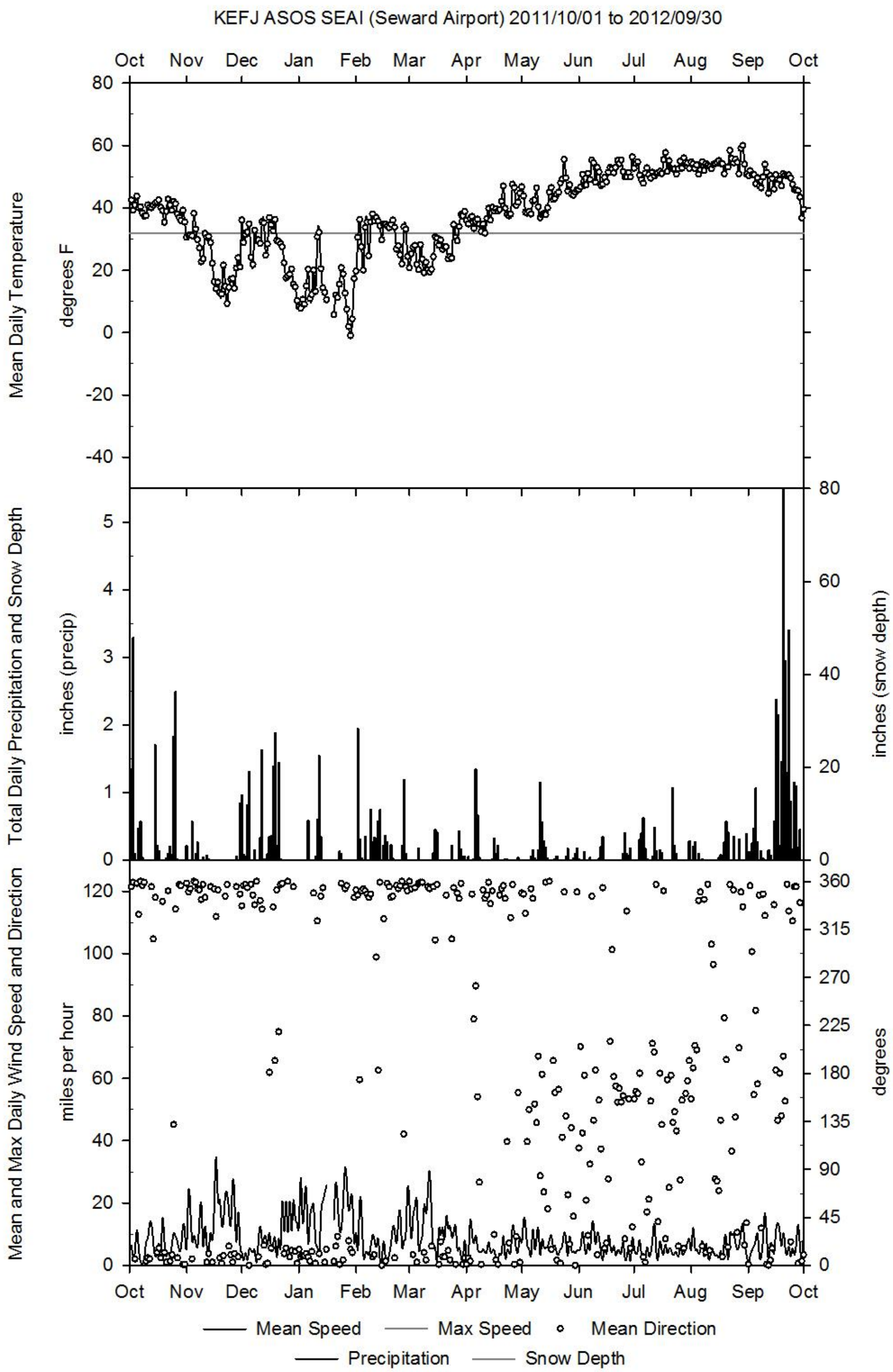
[3]Snow water equivalent measured close to the end of the month listed.
[4]Cummulative snow depth measured close to the end of the month listed.
[5]Values are not available.


KATM SNCO THFO (Three Forks) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80 60 40 20 0 -20 -40
Total Daily Precipitation and Snow Depth
inches (precip)
5 4 3 2 1 0
inches (snow depth)
80 60 40 20 0
Mean and Max Daily Wind Speed and Direction
miles per hour
120 100 80 60 40 20 0
degrees
360 315 270 225 180 135 90 45 0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ ASOS HOAI (Homer Airport) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 24 | 1 | -2 | -10 | 5 | 4 | 22 | 26 | 34 | 38 | 39 | 26 | -10 |
| Max. | 42 | 33 | 34 | 29 | 33 | 33 | 39 | 45 | 49 | 51 | 53 | 54 | 54 |
| Mean | 32.6 | 16.3 | 21.6 | 2.7 | 22.8 | 17.0 | 29.1 | 35.2 | 42.3 | 44.7 | 45.7 | 44.8 | 29.6 |
| # days <32 F | 16 | 29 | 26 | 31 | 25 | 30 | 24 | 10 | 0 | 0 | 0 | 1 | 192 |
| % valid obs | 100 | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 32 | 12 | 11 | 2 | 18 | 19 | 33 | 40 | 48 | 51 | 53 | 44 | 2 |
| Max | 52 | 39 | 45 | 39 | 41 | 43 | 54 | 53 | 64 | 66 | 63 | 69 | 69 |
| Mean | 44.3 | 27.4 | 30.5 | 15.8 | 33.1 | 28.9 | 42.9 | 47.0 | 53.6 | 56.2 | 57.5 | 55.0 | 41.0 |
| # days <32 F | 0 | 19 | 12 | 29 | 5 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 87 |
| % valid obs | 100 | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 38.6 | 22.3 | 26.5 | 9.8 | 28.7 | 23.6 | 36.7 | 41.9 | 48.7 | 50.9 | 51.8 | 50.2 | 35.8 |
| % valid obs | 100 | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 3.24 | 1.58 | 5.08 | 2.09 | 5.33 | 0.46 | 0.72 | 0.81 | 1.78 | 1.22 | 1.89 | 5.25 | 29.45 |
| % valid obs | 100 | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 4.9 | 7.7 | 9.0 | 6.7 | 8.3 | 5.6 | 4.9 | 6.2 | 5.6 | 5.1 | 4.4 | 7.0 | |
| % valid obs | 100 | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 100 | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |


KEFJ ASOS HOAI (Homer Airport) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

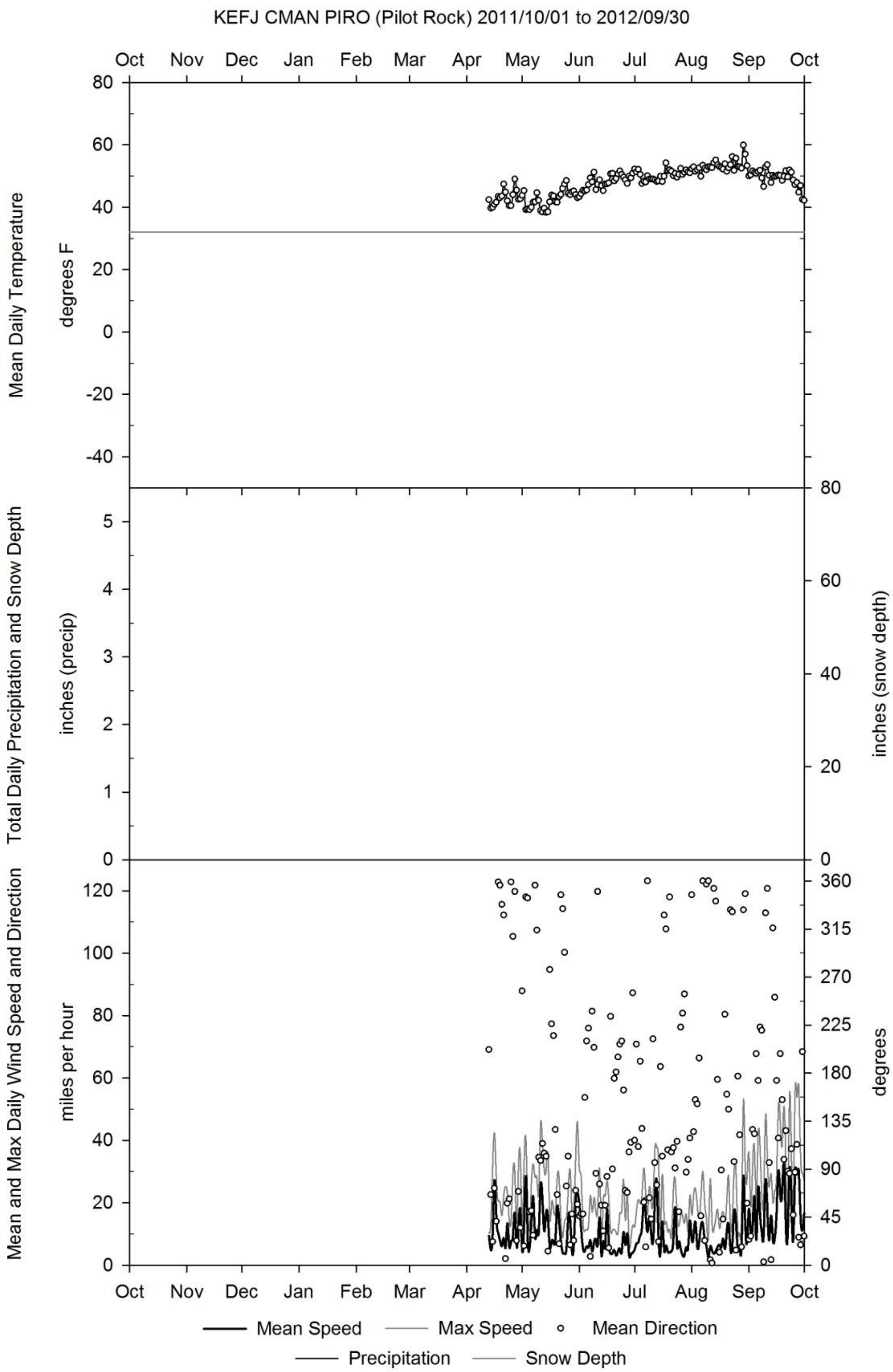
| 2012 Hydrologic Year - KEFJ ASOS SEAI (Seward Airport) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 27 | 7 | 5 | -4 | 13 | 11 | 21 | 29 | 38 | 42 | 41 | 32 | -4 |
| Max. | 39 | 34 | 34 | 28 | 35 | 35 | 38 | 47 | 50 | 52 | 54 | 49 | 54 |
| Mean | 34.2 | 18.9 | 21.6 | 8.7 | 26.7 | 21.2 | 30.8 | 37.0 | 44.0 | 47.6 | 47.8 | 42.9 | 32.0 |
| # days <32 F | 8 | 29 | 28 | 31 | 17 | 28 | 17 | 2 | 0 | 0 | 0 | 0 | 160 |
| % valid obs | 100 | 100 | 100 | 87 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 97 | 99 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 34 | 12 | 9 | 2 | 25 | 22 | 38 | 41 | 49 | 50 | 53 | 43 | 2 |
| Max | 53 | 42 | 41 | 37 | 43 | 48 | 61 | 66 | 66 | 70 | 67 | 63 | 70 |
| Mean | 45.4 | 27.8 | 31.0 | 18.9 | 35.6 | 33.5 | 46.0 | 49.5 | 57.2 | 57.4 | 59.5 | 53.1 | 43.1 |
| # days <32 F | 0 | 16 | 13 | 28 | 5 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 72 |
| % valid obs | 100 | 100 | 100 | 87 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 97 | 99 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 39.4 | 23.2 | 26.4 | 14.0 | 31.3 | 27.4 | 38.9 | 43.4 | 51.1 | 52.5 | 53.9 | 48.0 | 37.7 |
| % valid obs | 100 | 100 | 100 | 87 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 97 | 99 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 12.82 | 2.91 | 10.16 | 3.36 | 8.24 | 2.09 | 2.84 | 3.23 | 1.59 | 4.12 | 3.11 | 26.74 | 81.21 |
| % valid obs | 100 | 100 | 100 | 87 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 6.7 | 14.6 | 9.2 | 17.0 | 8.2 | 11.2 | 6.0 | 6.8 | 6.1 | 5.0 | 5.9 | 7.0 | |
| % valid obs | 100 | 100 | 100 | 81 | 97 | 100 | 100 | 100 | 100 | 100 | 97 | 99 | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |



KEFJ ASOS SEAI (Seward Airport) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ CMAN PIRO (Pilot Rock) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | 37.4 | 33.6 | 43.0 | 46.2 | 48.2 | 41.0 | 33.6 |
| Max. | | | | | | | 44.6 | 45.0 | 50.2 | 51.1 | 57.2 | 51.1 | 57.2 |
| Mean | | | | | | | 40.3 | 39.9 | 46.4 | 48.6 | 51.1 | 47.4 | 46.0 |
| # days <32 F | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| % valid obs | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 100 | 100 | 100 | 100 | 100 | 47 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | 42.1 | 41.4 | 46.4 | 49.3 | 51.4 | 44.8 | 41.4 |
| Max | | | | | | | 54.5 | 58.1 | 58.5 | 58.3 | 63.3 | 57.6 | 63.3 |
| Mean | | | | | | | 47.0 | 45.7 | 51.9 | 53.1 | 56.7 | 51.6 | 51.3 |
| # days <32 F | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| % valid obs | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 100 | 100 | 100 | 100 | 100 | 47 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | 43.0 | 42.5 | 48.4 | 50.3 | 53.2 | 49.4 | 48.2 |
| % valid obs | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 100 | 100 | 100 | 100 | 100 | 47 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | 10.5 | 12.8 | 6.6 | 9.7 | 9.0 | 17.9 | |
| % valid obs | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | | | | | | | 42.3 | 45.9 | 30.9 | 37.6 | 53.0 | 57.7 | 57.7 |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

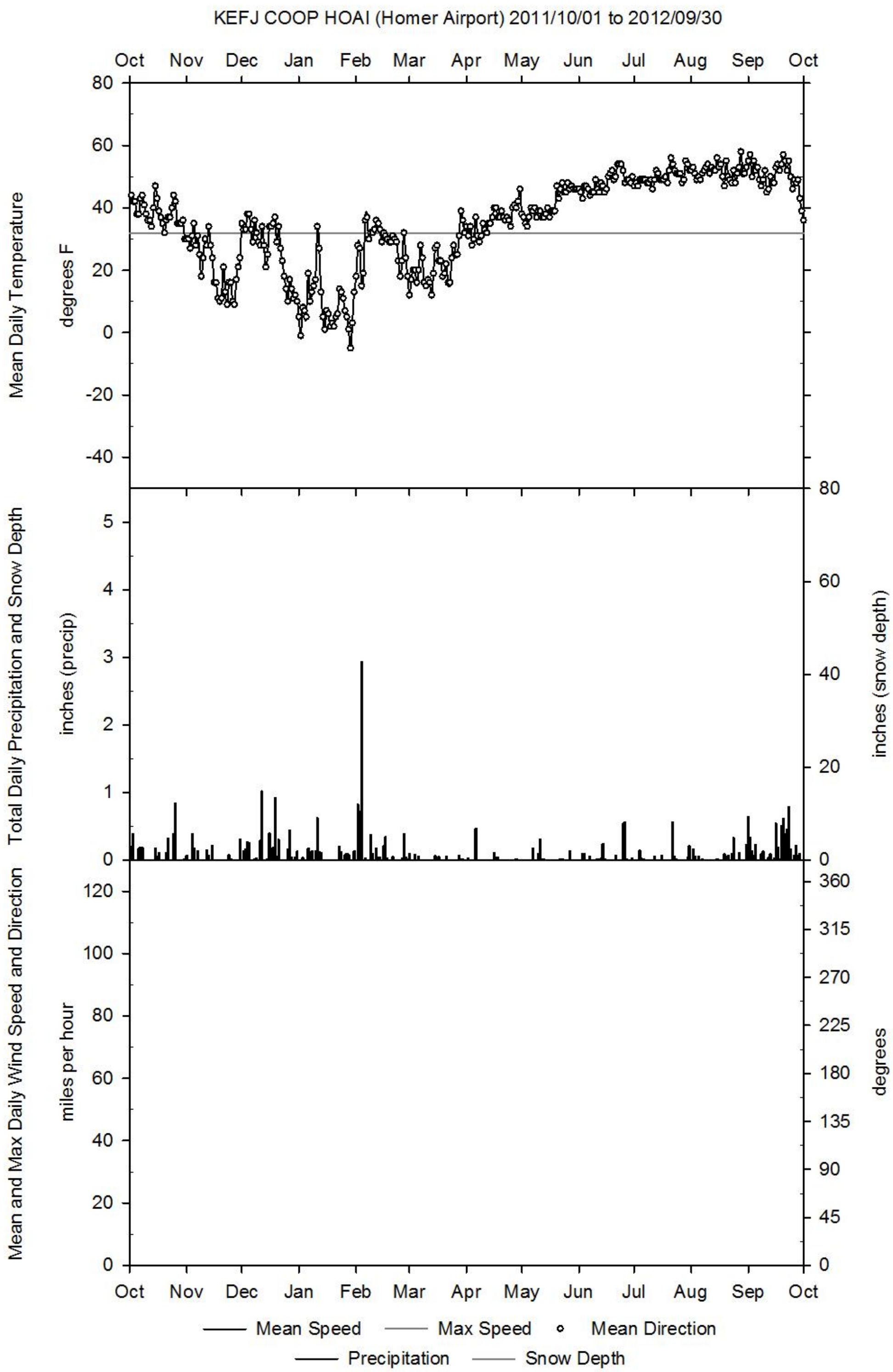
Station was not operating 10/01/2011 to 04/11/2012.



KEFJ CMAN PIRO (Pilot Rock) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ COOP HOAI (Homer Airport) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 23 | 0 | -2 | -13 | 4 | 2 | 21 | 25 | 33 | 36 | 39 | 26 | -13 |
| Max. | 42 | 32 | 33 | 29 | 32 | 33 | 39 | 44 | 49 | 50 | 51 | 54 | 54 |
| Mean | 31.7 | 15.2 | 20.9 | 1.5 | 22.0 | 15.9 | 28.4 | 34.6 | 41.5 | 44.1 | 45.0 | 44.0 | 28.7 |
| # days <32 F | 18 | 29 | 28 | 31 | 26 | 30 | 25 | 12 | 0 | 0 | 0 | 1 | 200 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 33 | 13 | 12 | 3 | 18 | 19 | 34 | 42 | 49 | 51 | 53 | 45 | 3 |
| Max | 52 | 40 | 45 | 40 | 42 | 44 | 56 | 54 | 65 | 66 | 65 | 65 | 66 |
| Mean | 44.6 | 27.9 | 31.0 | 16.5 | 33.8 | 29.5 | 43.5 | 48.2 | 54.5 | 56.5 | 58.4 | 55.5 | 41.7 |
| # days <32 F | 0 | 18 | 12 | 29 | 5 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 85 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 38.3 | 21.6 | 25.8 | 9.2 | 28.0 | 22.8 | 35.9 | 41.4 | 48.2 | 50.2 | 51.7 | 49.8 | 35.2 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 37.9 | 28.9 | 24.1 | 22.8 | 25.6 | 28.4 | 36.0 | 43.2 | 49.6 | 53.6 | 53.3 | 47.6 | 37.6 |
| 1981-2010 | 38.1 | 29.5 | 27.1 | 24.8 | 26.2 | 29.9 | 37.0 | 44.5 | 50.6 | 54.6 | 53.9 | 48.1 | 38.7 |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 3.24 | 1.59 | 5.09 | 2.09 | 6.46 | 0.47 | 0.72 | 0.81 | 1.78 | 1.22 | 1.90 | 5.25 | 30.63 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 3.13 | 2.74 | 2.83 | 2.22 | 1.81 | 1.52 | 1.20 | 0.97 | 0.96 | 1.56 | 2.46 | 3.06 | 24.47 |
| 1981-2010 | 2.57 | 2.79 | 3.08 | 2.63 | 1.71 | 1.65 | 1.07 | 0.82 | 0.82 | 1.56 | 2.34 | 3.31 | 24.32 |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean[1] | 0 | 1 | 4 | 4 | 5 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

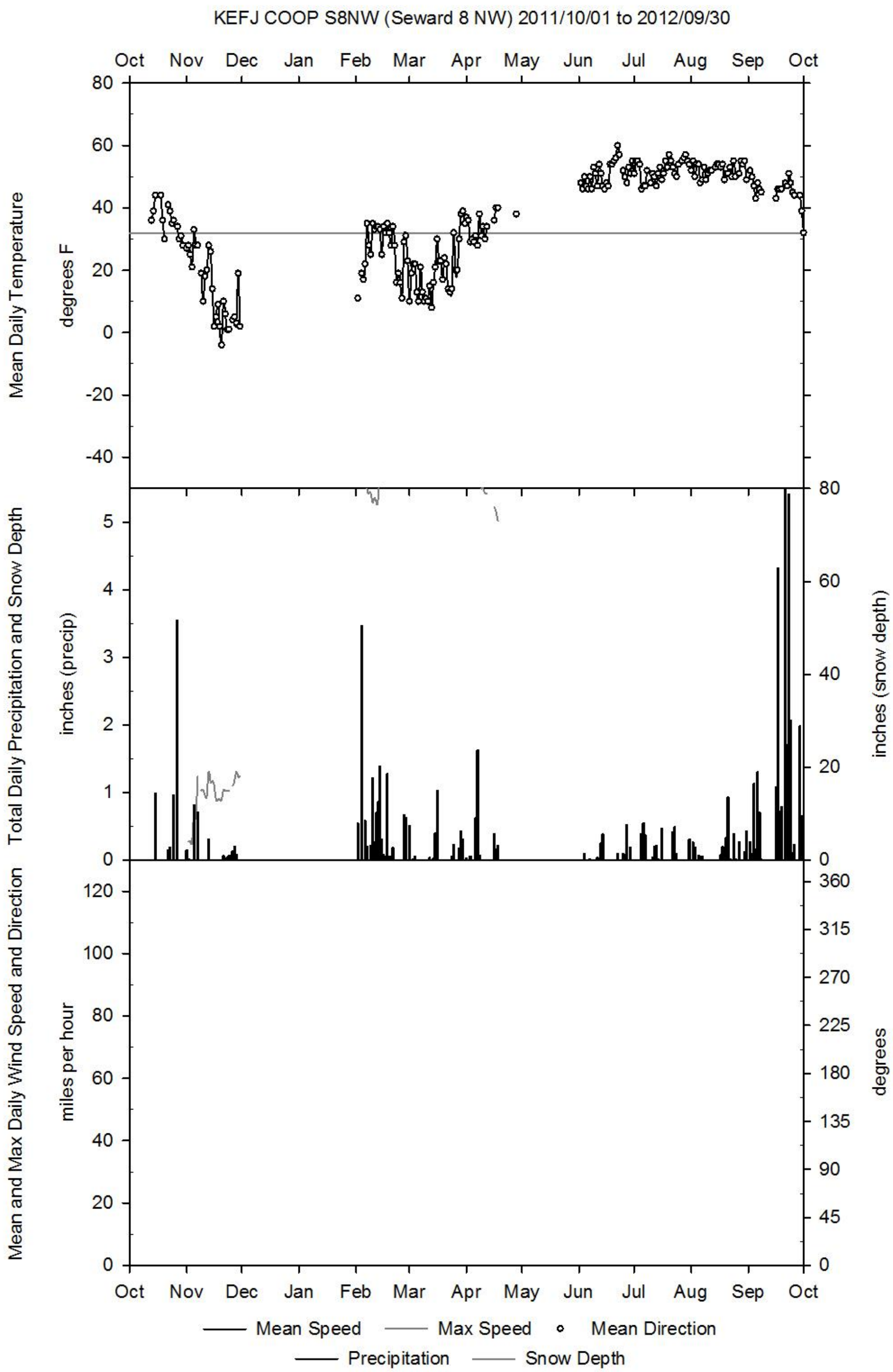
[1]Period of record used: 09/01/1932 to 09/30/2012



KEFJ COOP HOAI (Homer Airport) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ COOP S8NW (Seward 8 NW) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 17 | -13 | | | -11 | -9 | 15 | | 27 | 36 | 34 | 22 | -13 |
| Max. | 34 | 28 | | | 33 | 32 | 33 | | 46 | 48 | 47 | 45 | 48 |
| Mean | 25.6 | 3.4 | | | 17.9 | 7.8 | 21.8 | | 37.6 | 41.5 | 41.1 | 37.2 | 25.8 |
| # days <32 F | 11 | 27 | | | 23 | 29 | 12 | | 5 | 0 | 0 | 3 | 110 |
| % valid obs | 48 | 90 | 0 | 0 | 97 | 100 | 50 | 0 | 97 | 94 | 90 | 67 | 61 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 37 | 5 | | | 22 | 22 | 41 | | 55 | 52 | 55 | 43 | 5 |
| Max | 54 | 37 | | | 40 | 46 | 56 | | 79 | 76 | 69 | 62 | 79 |
| Mean | 45.1 | 23.3 | | | 33.9 | 33.7 | 45.3 | | 64.2 | 62.7 | 62.8 | 53.7 | 47.4 |
| # days <32 F | 0 | 19 | | | 6 | 14 | 0 | | 0 | 0 | 0 | 0 | 39 |
| % valid obs | 52 | 90 | 0 | 0 | 97 | 100 | 50 | 0 | 100 | 94 | 94 | 67 | 62 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 35.3 | 13.4 | | | 26.0 | 20.7 | 33.6 | | 50.8 | 52.2 | 52.1 | 45.5 | 36.6 |
| % valid obs | 48 | 90 | 0 | 0 | 97 | 100 | 50 | 0 | 97 | 94 | 90 | 67 | 61 |
| POR mean[1] | 34.8 | 23.0 | 19.0 | 18.7 | 21.8 | 27.5 | 35.4 | 43.8 | 51.2 | 55.0 | 53.0 | 46.1 | 35.8 |
| 1981-2010 | 34.9 | 22.9 | 20.2 | 17.7 | 21.9 | 27.3 | 35.7 | 44.2 | 51.4 | 55.1 | 53.2 | 46.1 | 36.0 |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 6.00 | 2.49 | | | 13.18 | 2.81 | 3.15 | | 1.78 | 3.61 | 3.48 | 29.10 | 65.59 |
| % valid obs | 45 | 90 | 0 | 0 | 97 | 100 | 50 | 0 | 100 | 94 | 94 | 67 | 61 |
| POR mean[1] | 10.53 | 5.87 | 8.77 | 6.99 | 5.90 | 4.62 | 3.97 | 3.31 | 2.48 | 2.83 | 6.43 | 9.06 | 70.76 |
| 1981-2010 | 9.34 | 5.75 | 8.96 | 6.97 | 5.24 | 5.16 | 4.16 | 2.97 | 2.10 | 2.67 | 5.66 | 8.43 | 67.41 |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0 | 14 | | | 87 | 89 | 79 | | 0 | 0 | 0 | 0 | |
| % valid obs | 42 | 90 | 0 | 0 | 97 | 100 | 50 | 0 | 100 | 90 | 94 | 67 | |
| POR mean[1] | 1 | 8 | 23 | 36 | 49 | 56 | 48 | 12 | 0 | 0 | 0 | 0 | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

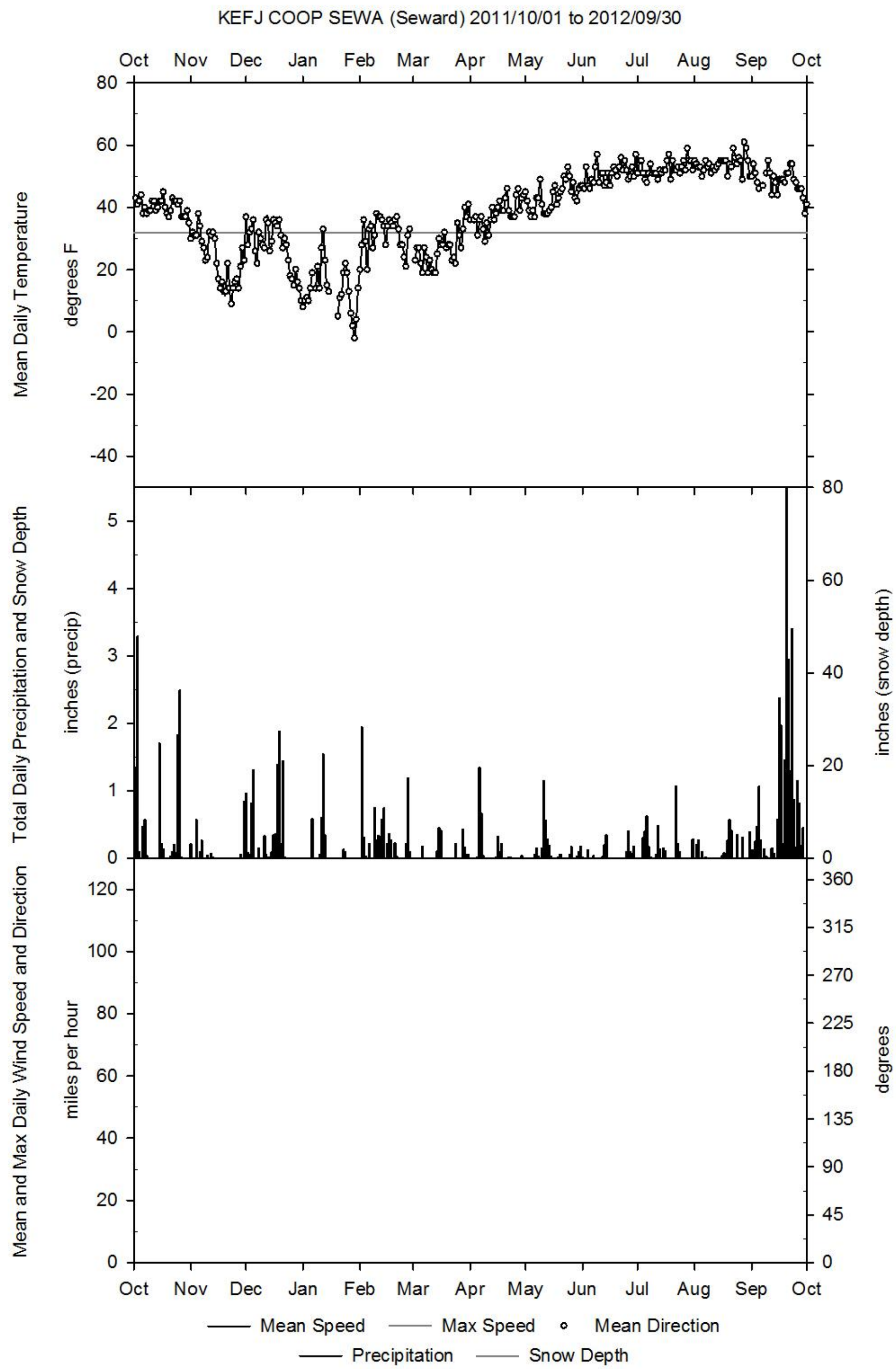
[1]Period of record used: 07/01/1983 to 07/31/2012



KEFJ COOP S8NW (Seward 8 NW) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80 60 40 20 0 -20 -40
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
5 4 3 2 1 0
80 60 40 20 0
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
120 100 80 60 40 20 0
360 315 270 225 180 135 90 45 0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ COOP SEWA (Seward) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 27 | 6 | 4 | -5 | 12 | 11 | 21 | 28 | 35 | 40 | 41 | 32 | -5 |
| Max. | 40 | 33 | 32 | 29 | 34 | 34 | 37 | 47 | 50 | 51 | 53 | 49 | 53 |
| Mean | 34.0 | 18.5 | 20.9 | 8.2 | 26.5 | 20.4 | 30.3 | 36.6 | 43.7 | 46.9 | 47.2 | 42.5 | 31.5 |
| # days <32 F | 9 | 29 | 28 | 31 | 18 | 28 | 18 | 2 | 0 | 0 | 0 | 2 | 165 |
| % valid obs | 100 | 100 | 100 | 87 | 93 | 100 | 97 | 100 | 100 | 100 | 100 | 93 | 98 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 34 | 12 | 10 | 2 | 27 | 22 | 38 | 42 | 49 | 50 | 53 | 44 | 2 |
| Max | 53 | 43 | 42 | 37 | 43 | 49 | 61 | 66 | 68 | 71 | 68 | 63 | 71 |
| Mean | 45.7 | 28.5 | 31.5 | 20.0 | 36.9 | 34.0 | 46.7 | 50.4 | 58.0 | 58.2 | 60.1 | 53.9 | 43.9 |
| # days <32 F | 0 | 15 | 11 | 28 | 6 | 8 | 1 | 0 | 0 | 0 | 0 | 2 | 71 |
| % valid obs | 100 | 100 | 100 | 84 | 93 | 100 | 97 | 100 | 100 | 100 | 100 | 93 | 97 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 39.8 | 23.4 | 26.4 | 14.2 | 31.8 | 27.2 | 38.4 | 43.5 | 50.9 | 52.6 | 53.8 | 48.3 | 37.8 |
| % valid obs | 100 | 100 | 100 | 84 | 93 | 100 | 97 | 100 | 100 | 100 | 100 | 93 | 97 |
| POR mean[1] | 39.6 | 31.0 | 26.6 | 25.0 | 27.5 | 31.0 | 38.1 | 45.5 | 51.8 | 56.1 | 55.7 | 49.4 | 39.8 |
| 1981-2010 | 39.6 | 30.9 | 28.9 | 27.1 | 28.3 | 32.1 | 38.7 | 46.4 | 52.2 | 56.0 | 55.7 | 49.5 | 40.5 |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 12.82 | 2.91 | 8.59 | 3.34 | 8.11 | 2.09 | 2.78 | 3.24 | 1.59 | 4.13 | 3.11 | 26.29 | 78.99 |
| % valid obs | 100 | 97 | 97 | 77 | 93 | 94 | 93 | 100 | 100 | 100 | 100 | 100 | 96 |
| POR mean[1] | 9.99 | 7.10 | 7.58 | 6.13 | 5.78 | 3.73 | 4.03 | 3.88 | 2.27 | 2.63 | 5.19 | 10.42 | 68.72 |
| 1981-2010 | 9.35 | 7.31 | 9.54 | 8.07 | 6.05 | 4.42 | 4.52 | 3.37 | 2.42 | 2.80 | 5.61 | 9.86 | 73.32 |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean[1] | 0 | 1 | 4 | 6 | 8 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

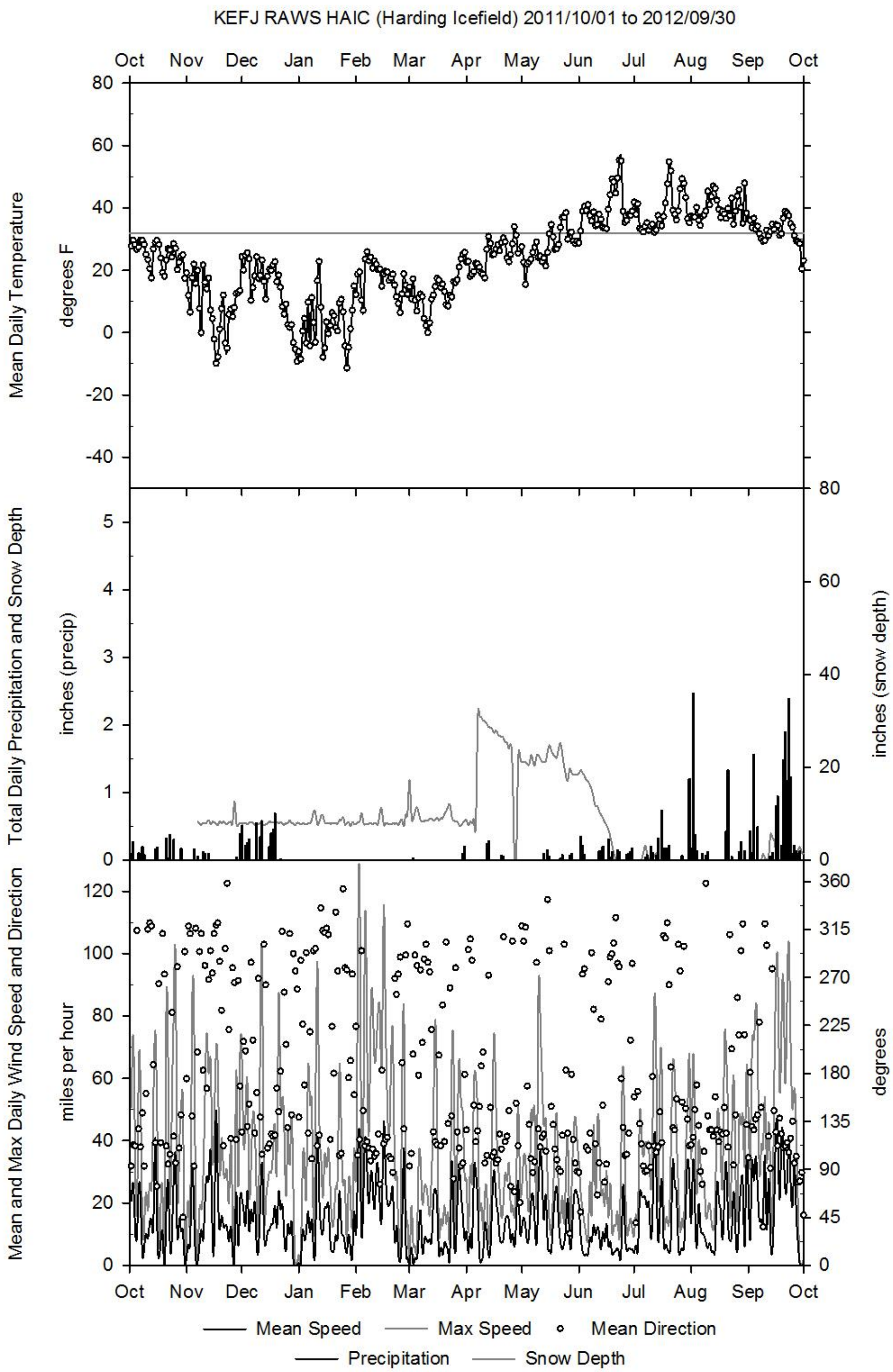
[1]Period of record used: 09/01/1949 to 09/30/2012. Values cited are from http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak8371 (current Jan 29, 2013). All other summary data are derived from data acquired from the GHCN-Daily database for Station ID# USW00026438. Note that GHCN-Daily records for USW00026438 are integrated (mingled) records for stations with WBAN# 26438. These stations include 'Seward', which reportedly ceased operation on (07/24/2010, NOAA Multi-Network Metadata System), and 'Seward Airport'.



KEFJ COOP SEWA (Seward) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ RAWS HAIC (Harding Icefield) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 9.7 | -14.6 | -13.0 | -14.8 | 0.1 | -2.7 | 12.4 | 7.3 | 26.4 | 29.7 | 31.3 | 16.7 | -14.8 |
| Max. | 28.2 | 20.8 | 21.7 | 21.9 | 24.6 | 21.2 | 26.4 | 32.0 | 47.5 | 45.7 | 43.0 | 36.3 | 47.5 |
| Mean | 21.7 | 3.6 | 9.0 | -2.2 | 13.4 | 8.5 | 19.9 | 22.7 | 33.8 | 35.2 | 36.1 | 29.4 | 19.3 |
| # days <32 F | 31 | 30 | 31 | 31 | 29 | 31 | 30 | 29 | 14 | 8 | 1 | 22 | 287 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 96 | 100 | 99 | 100 | 96 | 99 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 20.7 | -8.7 | -5.3 | -8.5 | 12.7 | 4.1 | 22.1 | 23.9 | 37.8 | 32.9 | 36.7 | 25.7 | -8.7 |
| Max | 35.4 | 27.1 | 30.6 | 24.3 | 27.5 | 36.7 | 48.7 | 56.8 | 69.8 | 66.4 | 57.7 | 45.7 | 69.8 |
| Mean | 28.6 | 14.4 | 17.3 | 9.2 | 21.3 | 21.0 | 32.7 | 35.7 | 52.0 | 44.2 | 45.3 | 36.1 | 29.8 |
| # days <32 F | 24 | 30 | 31 | 31 | 29 | 30 | 18 | 13 | 0 | 0 | 0 | 5 | 211 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 96 | 100 | 99 | 100 | 96 | 99 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 24.9 | 8.8 | 13.1 | 3.4 | 17.2 | 13.3 | 25.0 | 27.8 | 40.0 | 38.8 | 39.8 | 32.4 | 23.6 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 96 | 100 | 99 | 100 | 96 | 99 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 2.39 | 1.46 | 4.02 | 0.00 | 0.02 | 0.34 | 0.66 | 0.59 | 2.34 | 3.73 | 5.59 | 13.75 | 34.89 |
| % valid obs | 97 | 99 | 99 | 99 | 91 | 100 | 99 | 95 | 100 | 97 | 100 | 88 | 97 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | 8.2 | 7.9 | 8.2 | 8.6 | 9.1 | 23.1 | 21.3 | 11.3 | 1.5 | | 2.3 | |
| % valid obs | 0 | 81 | 100 | 100 | 91 | 96 | 69 | 96 | 64 | 20 | 0 | 36 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 13.9 | 15.5 | 12.8 | 11.9 | 21.3 | 11.1 | 13.1 | 15.6 | 7.5 | 16.8 | 15.4 | 21.9 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 96 | 100 | 99 | 100 | 96 | |
| Max speed | 98.7 | 81.7 | 98.4 | 97.3 | 119.5 | 78.7 | 74.5 | 86.6 | 63.8 | 85.2 | 71.1 | 103.1 | 119.5 |
| Max direction | 129 | 104 | 106 | 120 | 142 | 113 | 94 | 103 | 114 | 103 | 118 | 101 | 142 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 42.0 | 13.1 | 5.8 | 8.4 | 25.7 | 84.8 | 150.4 | 196.8 | 211.4 | 172.2 | 130.9 | 65.9 | 1107.4 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 96 | 99 | 99 | 100 | 96 | 99 |

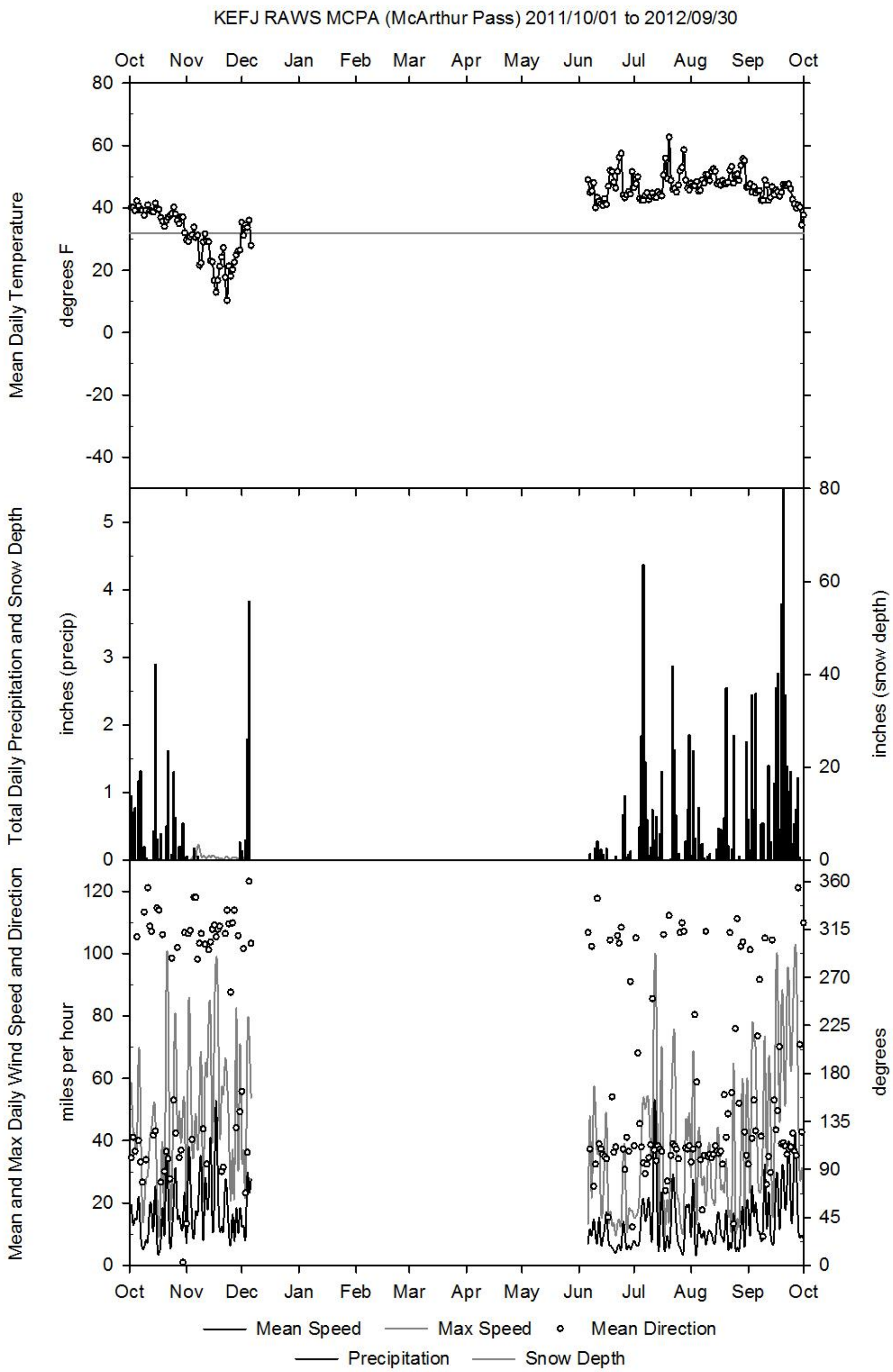
[2]A displacement precipitation gauge (filled with an antifreeze solution) is used at the Harding Icefield RAWS. By design, this gauge is capable of accurately measuring winter-time precipitation. In reality, undercatch (the difference between the actual amount of snow and the amount measured by a precipitation gauge) is a signficant problem because of the extremely windy nature of the site. Measured precipitation is only a fraction of the snow water equivalent reflected by the adjacent snowpack.


KEFJ RAWS HAIC (Harding Icefield) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ RAWS MCPA (McArthur Pass) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year* |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 25.5 | 4.8 | 26.4 | | | | | | 37.8 | 39.9 | 42.3 | 31.8 | 4.8 |
| Max. | 38.5 | 32.5 | 32.0 | | | | | | 48.0 | 55.2 | 50.9 | 46.4 | 55.2 |
| Mean | 35.3 | 21.0 | 30.0 | | | | | | 42.3 | 44.3 | 46.3 | 41.3 | 38.2 |
| # days <32 F | 4 | 29 | 4 | | | | | | 0 | 0 | 0 | 1 | 38 |
| % valid obs | 100 | 100 | 14 | 0 | 0 | 0 | 0 | 0 | 85 | 100 | 100 | 100 | 50 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 32.0 | 15.4 | 31.3 | | | | | | 42.1 | 44.1 | 46.6 | 40.6 | 15.4 |
| Max | 47.1 | 38.5 | 38.7 | | | | | | 65.1 | 71.1 | 61.5 | 53.6 | 71.1 |
| Mean | 41.2 | 28.3 | 35.7 | | | | | | 52.2 | 51.7 | 53.6 | 47.5 | 45.4 |
| # days <32 F | 0 | 20 | 1 | | | | | | 0 | 0 | 0 | 0 | 21 |
| % valid obs | 100 | 100 | 14 | 0 | 0 | 0 | 0 | 0 | 85 | 100 | 100 | 100 | 50 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 37.9 | 24.6 | 33.3 | | | | | | 46.4 | 47.4 | 49.4 | 44.2 | 41.4 |
| % valid obs | 100 | 100 | 14 | 0 | 0 | 0 | 0 | 0 | 85 | 100 | 100 | 100 | 50 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 14.49 | 0.64 | 5.90 | | | | | | 2.89 | 20.66 | 12.32 | 36.70 | 93.60 |
| % valid obs | 95 | 20 | 11 | 0 | 0 | 0 | 0 | 0 | 85 | 95 | 100 | 91 | 42 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 0.7 | 0.2 | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 93 | 98 | 14 | 0 | 0 | 0 | 0 | 0 | 85 | 100 | 100 | 100 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 14.8 | 20.1 | 19.4 | | | | | | 8.6 | 14.9 | 10.9 | 19.1 | |
| % valid obs | 100 | 100 | 14 | 0 | 0 | 0 | 0 | 0 | 85 | 100 | 100 | 100 | |
| Max speed | 90.6 | 98.0 | 73.6 | | | | | | 54.4 | 92.4 | 68.0 | 98.4 | 98.4 |
| Max direction | 121 | 297 | 108 | | | | | | 123 | 113 | 122 | 117 | 117 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | 157.3 | 127.8 | 116.1 | 60.0 | 461.3 |
| % valid obs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 85 | 100 | 100 | 100 | 32 |

*Station was not operating 12/05/2011 to 06/05/2012. Yearly summaries reflect missing data. Solar radiation sensor was not operating 10/01/2011 to 06/05/2012.

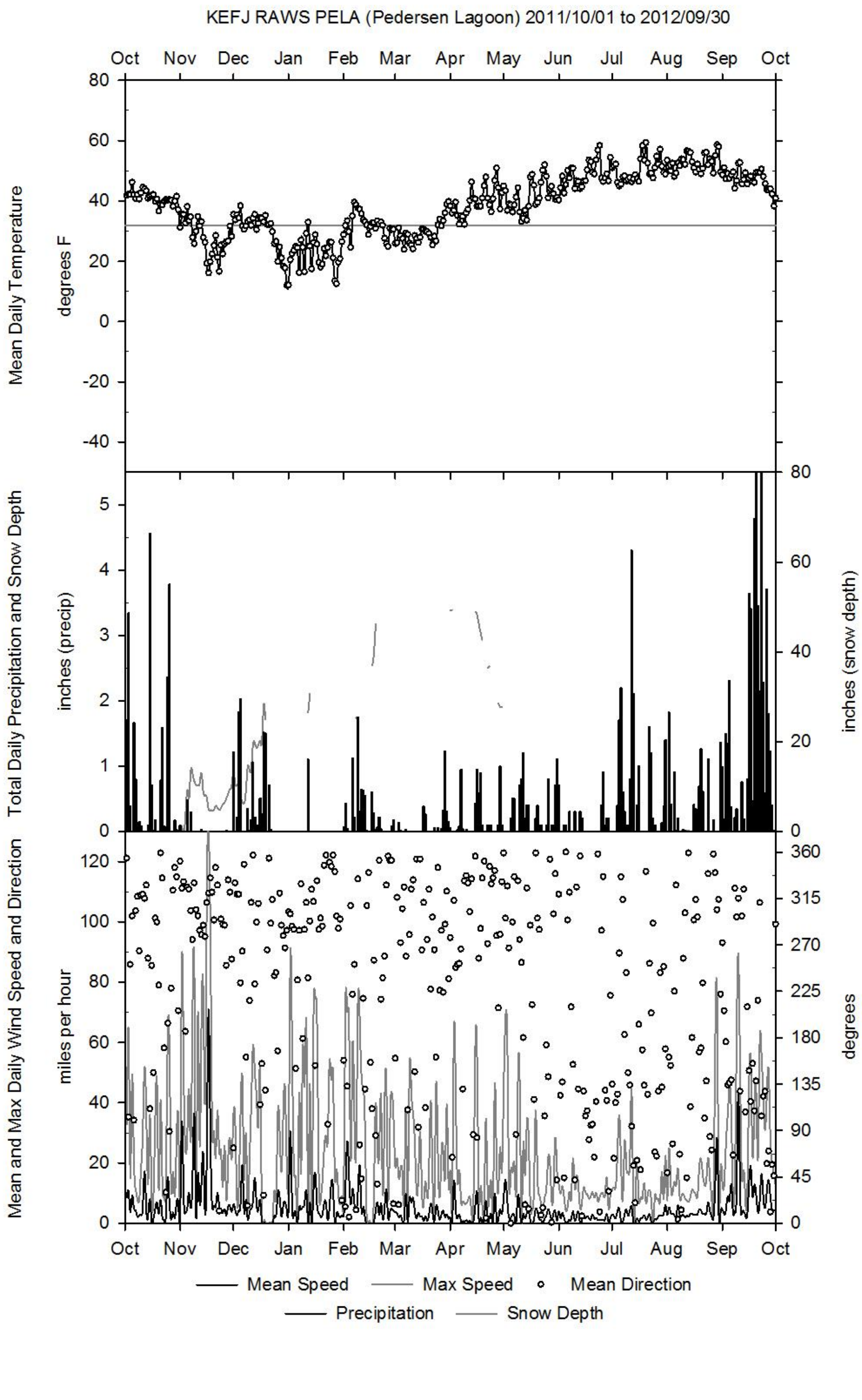
[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.



KEFJ RAWS MCPA (McArthur Pass) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ RAWS PELA (Pedersen Lagoon) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 26.2 | 12.0 | 9.5 | 9.3 | 19.2 | 21.4 | 29.1 | 31.1 | 38.7 | 41.9 | 45.1 | 35.6 | 9.3 |
| Max. | 41.9 | 31.8 | 33.6 | 31.8 | 35.4 | 33.8 | 44.4 | 42.8 | 48.7 | 51.8 | 53.6 | 49.1 | 53.6 |
| Mean | 36.8 | 23.6 | 26.3 | 18.4 | 28.7 | 25.8 | 34.7 | 36.1 | 44.0 | 46.1 | 48.5 | 43.8 | 34.4 |
| # days <32 F | 2 | 30 | 26 | 31 | 24 | 27 | 8 | 5 | 0 | 0 | 0 | 0 | 153 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 34.0 | 21.6 | 14.4 | 16.2 | 29.1 | 28.6 | 33.8 | 37.6 | 46.6 | 47.5 | 50.4 | 45.1 | 14.4 |
| Max | 53.1 | 43.9 | 41.0 | 35.8 | 47.7 | 51.4 | 63.1 | 65.5 | 69.6 | 68.9 | 65.3 | 59.9 | 69.6 |
| Mean | 45.0 | 32.7 | 32.8 | 27.8 | 36.3 | 38.6 | 48.8 | 49.8 | 55.8 | 55.8 | 58.2 | 51.1 | 44.4 |
| # days <32 F | 0 | 13 | 9 | 25 | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 40.7 | 27.9 | 29.3 | 22.8 | 31.9 | 29.8 | 39.8 | 41.4 | 48.9 | 50.2 | 52.5 | 47.0 | 38.5 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 22.72 | 2.06 | 10.55 | 1.18 | 7.19 | 3.06 | 5.56 | 9.30 | 3.10 | 19.01 | 10.48 | 50.81 | 145.02 |
| % valid obs | 99 | 38 | 63 | 9 | 70 | 39 | 99 | 100 | 100 | 100 | 99 | 98 | 76 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 7.6 | 14.7 | 26.9 | 32.3 | 49.3 | 41.8 | 1.9 | 0.0 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 100 | 100 | 55 | 1 | 4 | 1 | 9 | 5 | 24 | 13 | 29 | 1 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 5.2 | 12.6 | 4.8 | 5.9 | 6.3 | 3.3 | 3.1 | 3.1 | 1.8 | 2.3 | 4.5 | 9.2 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | 63.8 | 129.3 | 59.1 | 89.5 | 73.8 | 51.7 | 64.4 | 67.6 | 21.5 | 44.1 | 74.7 | 89.3 | 129.3 |
| Max direction | 98 | 308 | 50 | 327 | 83 | 311 | 315 | 315 | 133 | 94 | 327 | 315 | 308 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 35.9 | 18.7 | 6.8 | 13.4 | 23.8 | 78.1 | 121.4 | 134.4 | 168.2 | 119.7 | 104.0 | 50.0 | 874.3 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.

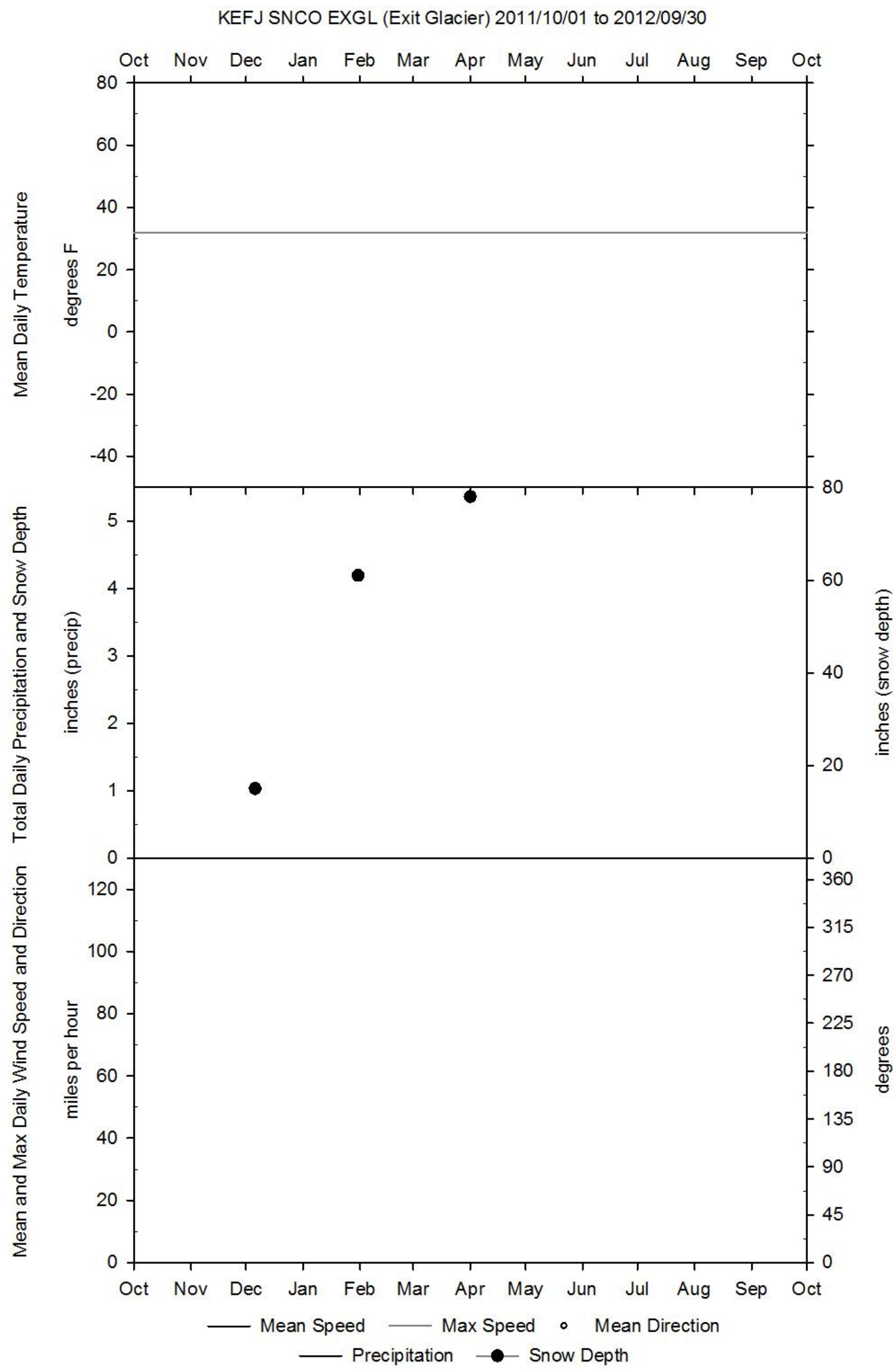

KEFJ RAWS PELA (Pedersen Lagoon) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ SNCO EXGL (Exit Glacier) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | | | | | | | |
| Max. | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | | | | | | | |
| Max | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[3] | | 3.5 | | 16.1 | | 26.9 | | | | | | | |
| % valid obs | | 100 | 0 | 100 | 0 | 100 | 0 | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010[5] | | 3.1 | 8.0 | 11.7 | 15.9 | 18.2 | 10.8 | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average[4] | | 15 | 0 | 61 | 0 | 78 | 0 | | | | | | |
| % valid obs | | 100 | | 100 | | 100 | | | | | | | |
| 1981-2010[5] | | 16 | 34 | 43 | 49 | 55 | 31 | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[3]Snow water equivalent measured close to the end of the month.

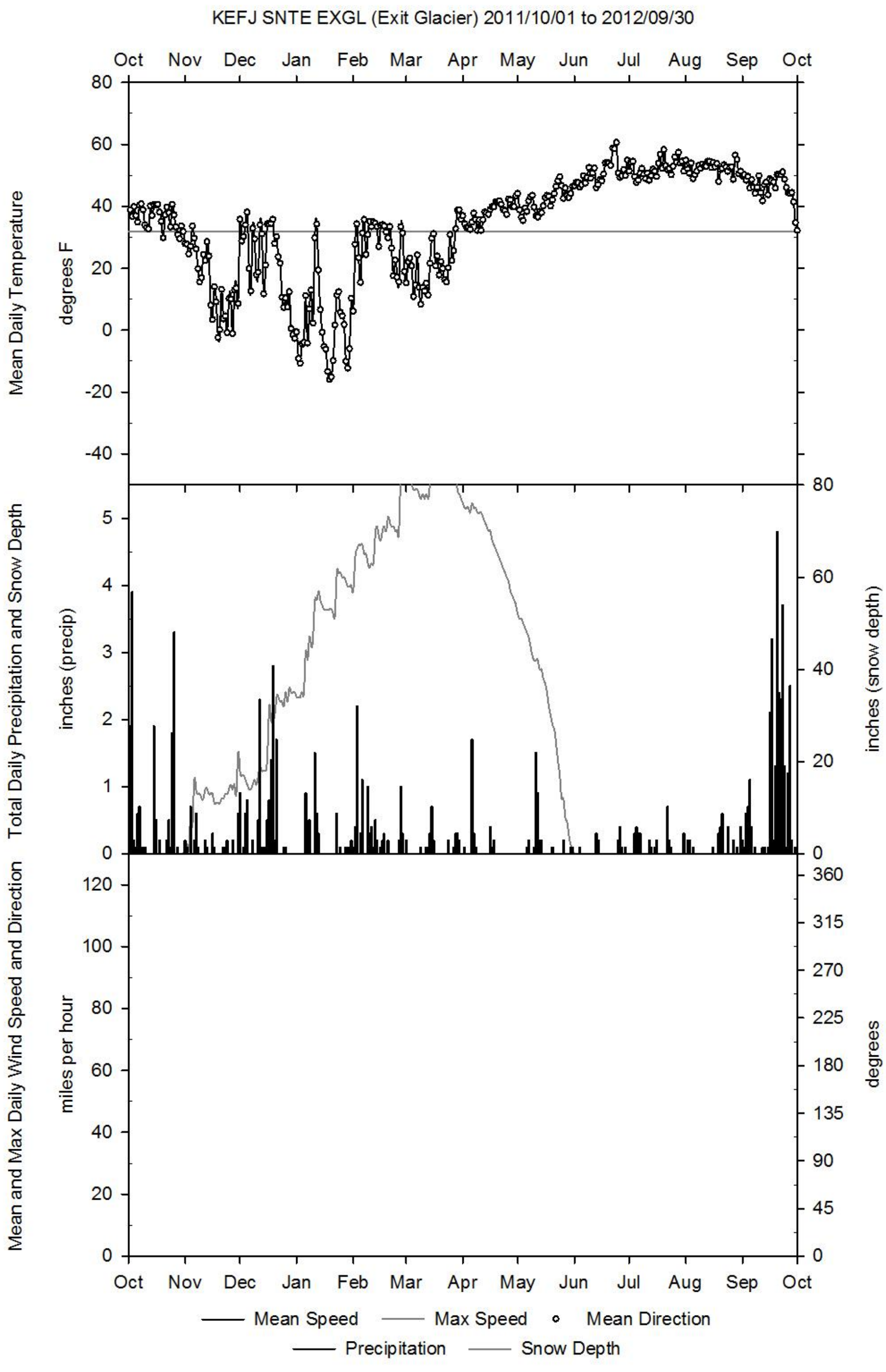
[4]Cummulative snow depth measured close to the end of the month listed.

[5]Values cited are from National Water and Climate Data Center (current Jan. 22, 2013).

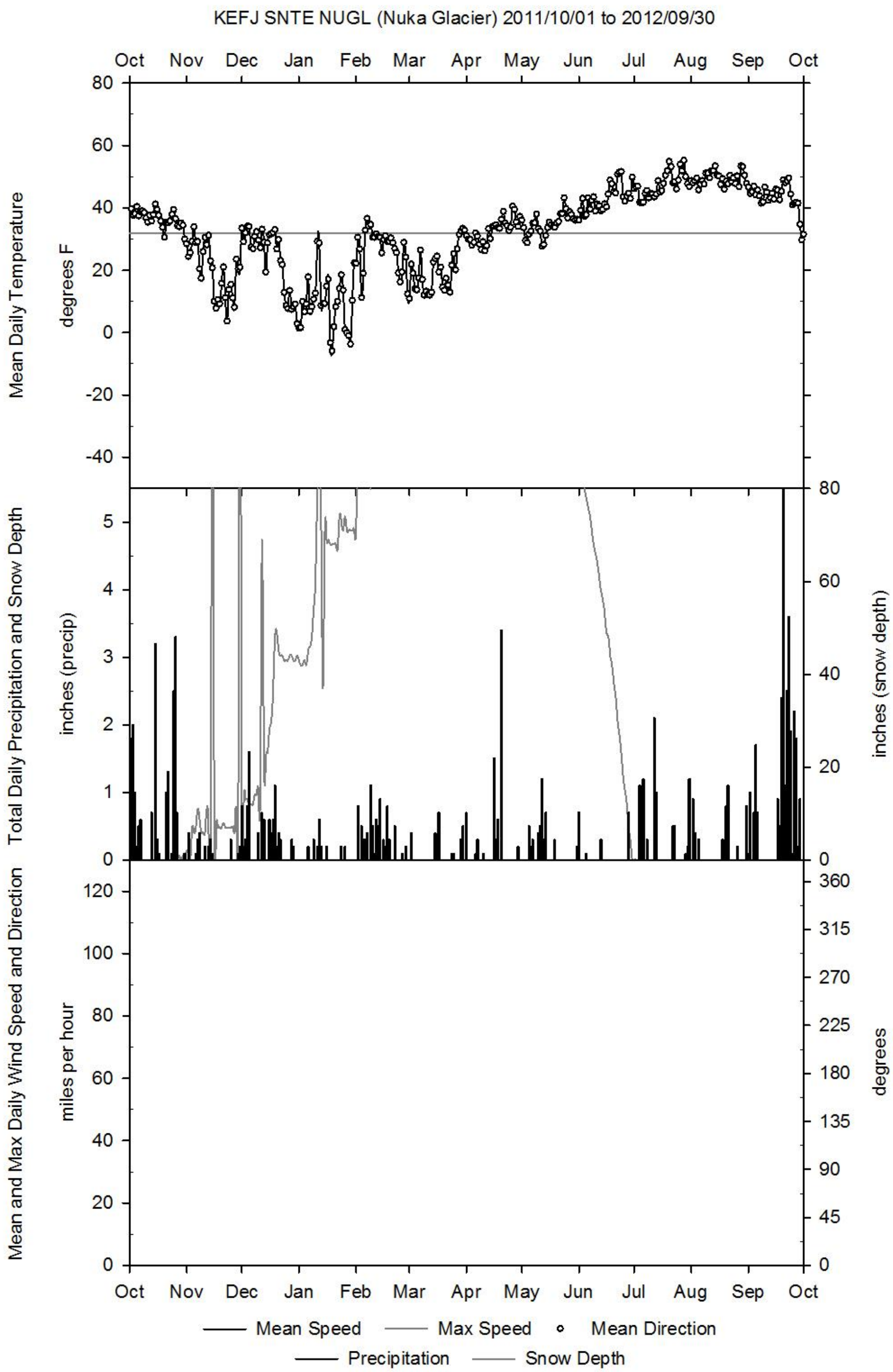

KEFJ SNCO EXGL (Exit Glacier) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ SNTE EXGL (Exit Glacier) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 19.8 | -10.7 | -16.2 | -21.5 | 0.1 | -6.0 | 17.1 | 19.0 | 30.6 | 36.7 | 33.3 | 24.3 | -21.5 |
| Max. | 37.9 | 31.6 | 32.7 | 32.5 | 32.9 | 32.7 | 34.5 | 40.8 | 48.4 | 49.3 | 50.7 | 48.0 | 50.7 |
| Mean | 28.6 | 5.4 | 12.6 | -7.2 | 20.1 | 8.5 | 26.9 | 32.5 | 39.5 | 44.2 | 42.9 | 39.3 | 24.4 |
| # days <32 F | 21 | 30 | 27 | 30 | 26 | 30 | 22 | 12 | 4 | 0 | 0 | 4 | 206 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 35.1 | 7.3 | 6.4 | -9.8 | 25.9 | 23.5 | 37.6 | 42.4 | 49.5 | 52.2 | 52.9 | 42.8 | -9.8 |
| Max | 53.2 | 43.0 | 42.6 | 36.9 | 43.0 | 54.1 | 60.4 | 63.7 | 77.7 | 77.4 | 69.4 | 63.0 | 77.7 |
| Mean | 44.8 | 24.3 | 28.5 | 10.6 | 35.7 | 36.1 | 50.5 | 52.0 | 61.8 | 60.8 | 61.6 | 53.5 | 43.3 |
| # days <32 F | 1 | 23 | 14 | 28 | 6 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 81 |
| % valid obs | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 36.2 | 15.4 | 20.9 | 1.6 | 28.1 | 22.3 | 38.0 | 42.1 | 51.0 | 52.3 | 52.3 | 46.1 | 33.9 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 16.40 | 4.40 | 12.30 | 5.00 | 9.00 | 2.60 | 2.90 | 3.70 | 1.40 | 3.20 | 3.20 | 28.70 | 92.80 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 97 | 100 | 93 | 99 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.1 | 12.3 | 25.1 | 51.6 | 69.9 | 81.2 | 67.1 | 29.8 | 0.0 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| POR mean[5] | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[5]Values are not available for this SNOTEL.

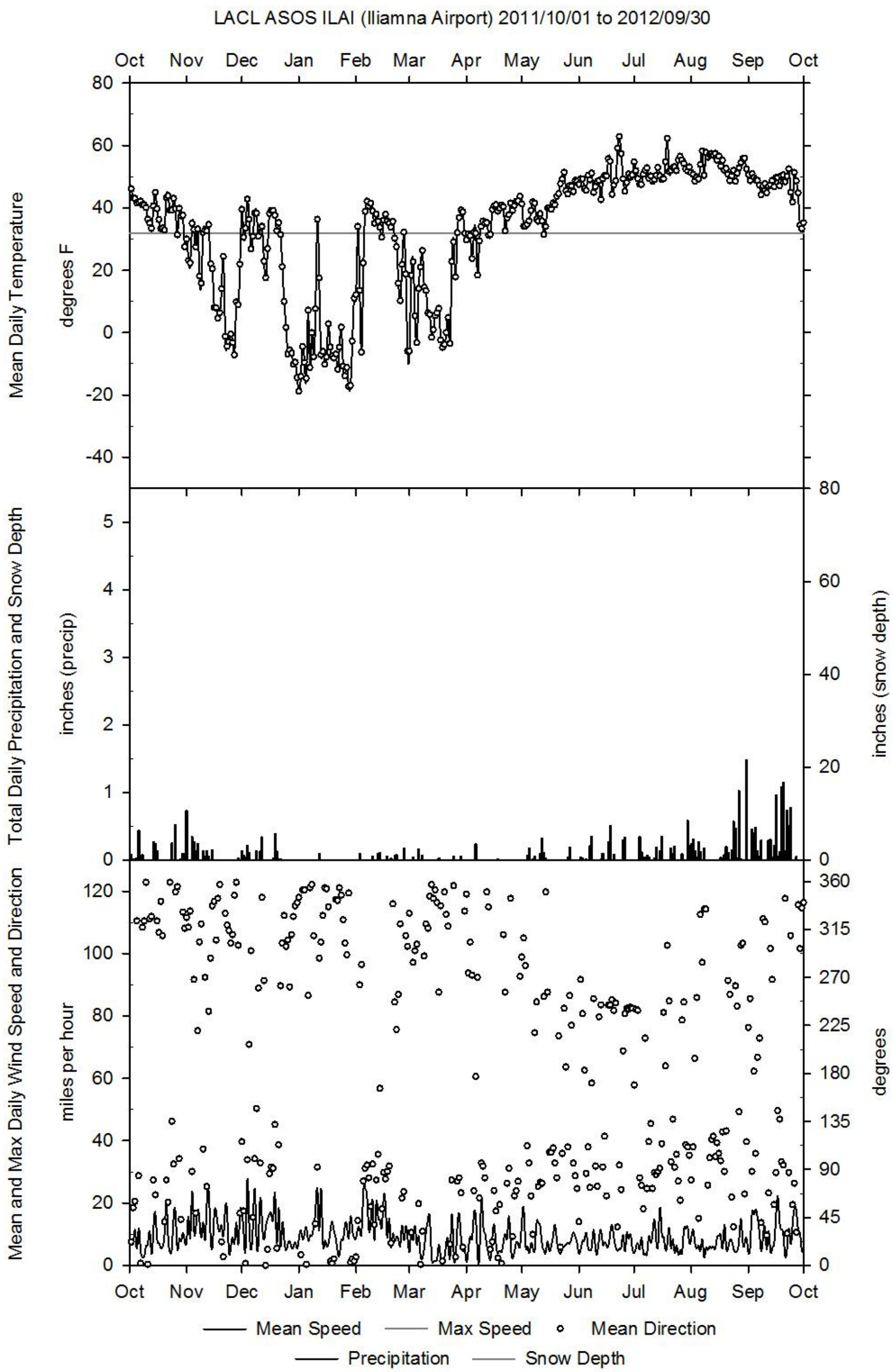

KEFJ SNTE EXGL (Exit Glacier) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - KEFJ SNTE NUGL (Nuka Glacier) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 20.8 | -3.2 | -8.3 | -16.9 | 2.0 | -0.2 | 10.1 | 18.3 | 31.3 | 33.6 | 34.5 | 20.8 | -16.9 |
| Max. | 38.0 | 31.5 | 31.4 | 23.8 | 34.3 | 31.1 | 32.8 | 35.6 | 41.7 | 48.0 | 48.6 | 46.8 | 48.6 |
| Mean | 31.2 | 13.6 | 16.6 | 2.6 | 20.8 | 12.9 | 25.5 | 29.8 | 36.7 | 41.1 | 42.3 | 38.0 | 25.9 |
| # days <32 F | 15 | 30 | 31 | 31 | 28 | 31 | 24 | 16 | 2 | 0 | 0 | 3 | 211 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 32.1 | 9.8 | 4.9 | 1.6 | 15.1 | 13.9 | 32.4 | 32.2 | 39.2 | 43.3 | 47.3 | 36.3 | 1.6 |
| Max | 46.9 | 37.0 | 38.4 | 35.1 | 39.8 | 48.8 | 53.2 | 53.1 | 64.3 | 67.8 | 62.8 | 55.4 | 67.8 |
| Mean | 40.9 | 25.1 | 27.2 | 17.7 | 30.2 | 26.5 | 40.4 | 40.8 | 50.9 | 53.4 | 55.7 | 48.1 | 38.1 |
| # days <32 F | 0 | 22 | 17 | 29 | 17 | 26 | 0 | 0 | 0 | 0 | 0 | 0 | 111 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 36.4 | 20.1 | 23.1 | 10.0 | 26.4 | 20.4 | 32.8 | 34.7 | 43.5 | 47.5 | 49.3 | 43.3 | 32.3 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 19.40 | 3.40 | 8.70 | 2.10 | 8.40 | 3.20 | 6.50 | 5.30 | 1.10 | 9.00 | 5.00 | 28.60 | 100.70 |
| % valid obs | 84 | 50 | 52 | 39 | 69 | 45 | 73 | 84 | 70 | 100 | 100 | 63 | 69 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 14.6 | 31.7 | 63.2 | 100.9 | 121.4 | 125.5 | 107.6 | 45.5 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |



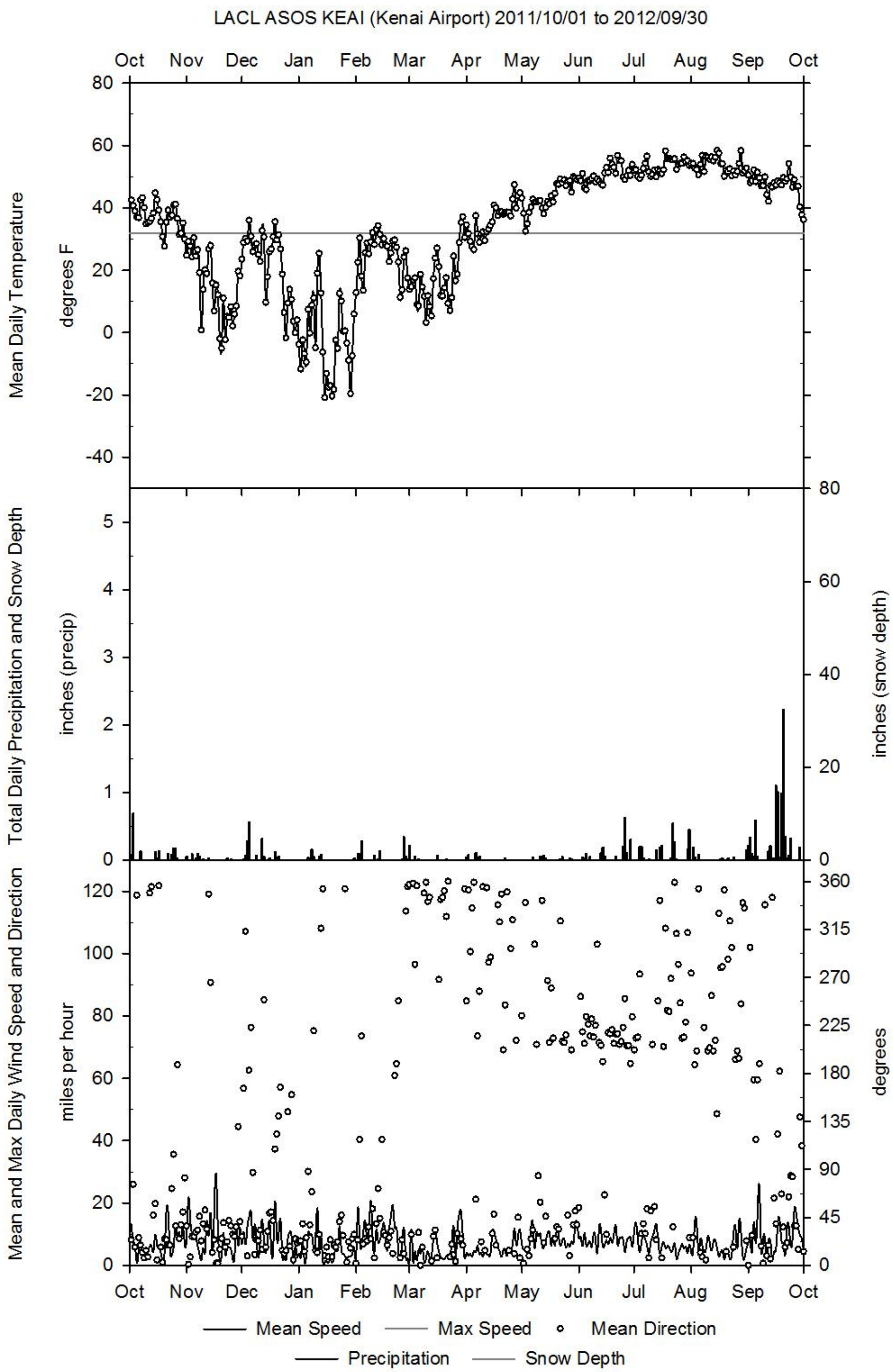
KEFJ SNTE NUGL (Nuka Glacier) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80 60 40 20 0 -20 -40
Total Daily Precipitation and Snow Depth
inches (precip)
5 4 3 2 1 0
inches (snow depth)
80 60 40 20 0
Mean and Max Daily Wind Speed and Direction
miles per hour
120 100 80 60 40 20 0
degrees
360 315 270 225 180 135 90 45 0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL ASOS ILAI (Iliamna Airport) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 23 | -9 | -21 | -21 | -14 | -14 | 10 | 23 | 36 | 39 | 40 | 25 | -21 |
| Max. | 42 | 31 | 39 | 33 | 40 | 36 | 37 | 43 | 49 | 52 | 53 | 49 | 53 |
| Mean | 32.8 | 9.0 | 16.1 | -9.3 | 20.3 | 4.2 | 28.2 | 34.7 | 42.3 | 46.6 | 47.6 | 41.2 | 26.1 |
| # days <32 F | 11 | 30 | 23 | 30 | 18 | 28 | 22 | 8 | 0 | 0 | 0 | 3 | 173 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 97 | 99 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 34 | -4 | -17 | -14 | 1 | 3 | 24 | 37 | 47 | 50 | 50 | 39 | -17 |
| Max | 51 | 42 | 46 | 40 | 47 | 45 | 55 | 60 | 76 | 75 | 69 | 58 | 76 |
| Mean | 44.4 | 22.7 | 25.5 | 3.5 | 33.0 | 22.2 | 43.1 | 48.1 | 58.0 | 57.5 | 59.0 | 52.0 | 39.1 |
| # days <32 F | 0 | 18 | 12 | 28 | 5 | 22 | 2 | 0 | 0 | 0 | 0 | 0 | 87 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 97 | 99 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 38.7 | 16.9 | 21.2 | -3.7 | 27.5 | 14.2 | 36.1 | 41.5 | 50.0 | 51.9 | 53.3 | 46.7 | 32.9 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 97 | 99 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 3.02 | 1.70 | 1.65 | 0.11 | 0.80 | 0.44 | 0.27 | 1.14 | 2.26 | 2.97 | 5.24 | 8.21 | 27.81 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 99 | 99 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 8.6 | 13.0 | 11.7 | 10.8 | 13.2 | 6.8 | 8.4 | 7.7 | 7.4 | 7.9 | 7.0 | 10.8 | |
| % valid obs | 99 | 100 | 100 | 100 | 100 | 99 | 98 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

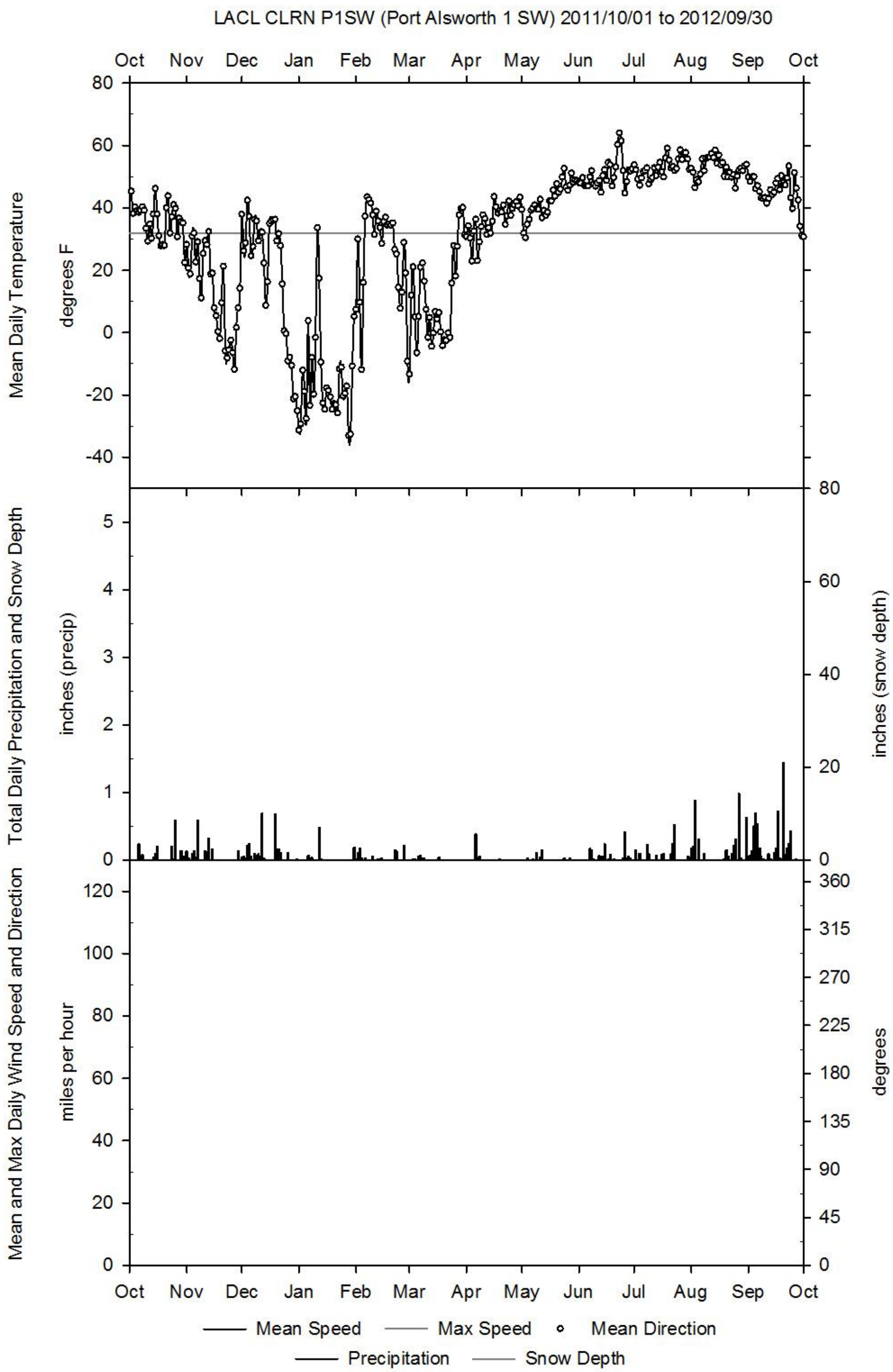


LACL ASOS ILAI (Iliamna Airport) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL ASOS KEAI (Kenai Airport) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 18 | -16 | -14 | -28 | -6 | -16 | 13 | 22 | 38 | 36 | 34 | 28 | -28 |
| Max. | 40 | 28 | 34 | 13 | 30 | 31 | 37 | 46 | 50 | 52 | 52 | 50 | 52 |
| Mean | 30.3 | 5.2 | 13.6 | -13.3 | 18.6 | 4.4 | 26.8 | 36.3 | 44.7 | 46.2 | 46.1 | 41.6 | 25.0 |
| # days <32 F | 16 | 30 | 29 | 31 | 29 | 31 | 21 | 8 | 0 | 0 | 0 | 2 | 197 |
| % valid obs | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 27 | 7 | 3 | -10 | 19 | 16 | 34 | 39 | 49 | 53 | 53 | 44 | -10 |
| Max | 50 | 36 | 41 | 33 | 41 | 44 | 57 | 60 | 68 | 72 | 68 | 60 | 72 |
| Mean | 43.4 | 21.5 | 26.6 | 7.0 | 30.2 | 27.0 | 44.4 | 50.8 | 57.2 | 60.0 | 60.2 | 52.5 | 40.1 |
| # days <32 F | 1 | 25 | 16 | 30 | 13 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 110 |
| % valid obs | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 36.9 | 14.6 | 20.8 | -2.2 | 25.2 | 17.4 | 36.3 | 43.7 | 50.8 | 53.3 | 53.6 | 47.2 | 33.1 |
| % valid obs | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 1.80 | 0.38 | 1.66 | 0.43 | 1.34 | 0.24 | 0.30 | 0.38 | 1.87 | 2.50 | 0.82 | 7.85 | 19.57 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 7.1 | 8.8 | 8.6 | 5.1 | 9.7 | 5.8 | 5.7 | 8.3 | 8.2 | 6.7 | 6.6 | 9.5 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

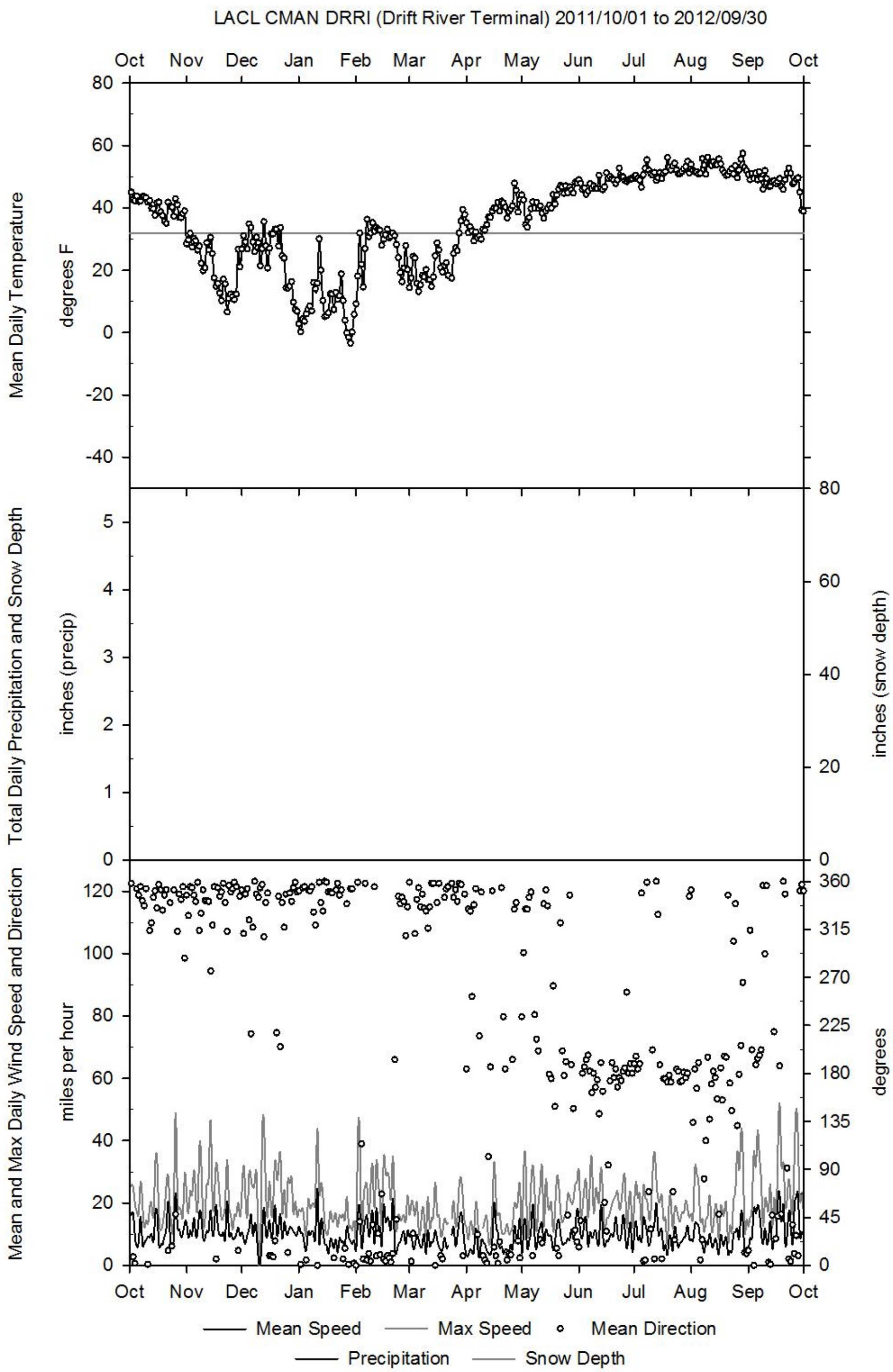

LACL ASOS KEAI (Kenai Airport) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL CLRN P1SW (Port Alsworth 1 SW) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 16.7 | -18.8 | -35.5 | -42.0 | -29.7 | -21.6 | 9.3 | 13.5 | 27.1 | 33.1 | 33.6 | 18.3 | -42.0 |
| Max. | 41.7 | 32.2 | 32.2 | 21.6 | 37.8 | 36.0 | 37.6 | 40.6 | 46.8 | 51.3 | 49.8 | 48.4 | 51.3 |
| Mean | 26.7 | 3.1 | 9.3 | -23.9 | 15.0 | -0.9 | 24.0 | 31.1 | 39.4 | 43.9 | 43.4 | 36.9 | 20.6 |
| # days <32 F | 23 | 29 | 29 | 31 | 24 | 29 | 28 | 15 | 6 | 0 | 0 | 8 | 222 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 27.7 | -4.5 | -26.7 | -22.7 | -0.8 | 3.9 | 29.3 | 37.9 | 47.8 | 50.2 | 48.6 | 37.8 | -26.7 |
| Max | 52.7 | 42.8 | 54.0 | 43.5 | 48.4 | 49.8 | 59.7 | 65.8 | 79.5 | 76.6 | 73.4 | 61.3 | 79.5 |
| Mean | 43.6 | 20.0 | 23.5 | -2.9 | 33.0 | 22.8 | 47.5 | 53.7 | 63.1 | 61.6 | 61.5 | 53.0 | 40.0 |
| # days <32 F | 1 | 22 | 14 | 29 | 9 | 22 | 1 | 0 | 0 | 0 | 0 | 0 | 98 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 35.7 | 13.3 | 16.8 | -14.2 | 25.5 | 12.2 | 36.3 | 42.8 | 51.0 | 52.9 | 52.5 | 44.9 | 30.7 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 100 | 100 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 1.82 | 1.83 | 2.86 | 0.82 | 0.98 | 0.27 | 0.45 | 0.42 | 1.46 | 1.93 | 4.00 | 5.73 | 22.57 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 100 | 100 | 100 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 23.4 | 5.0 | 0.4 | 1.2 | 13.6 | 61.0 | 105.9 | 125.5 | 135.0 | 108.3 | 93.2 | 52.7 | 725.2 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 100 | 100 | 100 |



LACL CLRN P1SW (Port Alsworth 1 SW) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

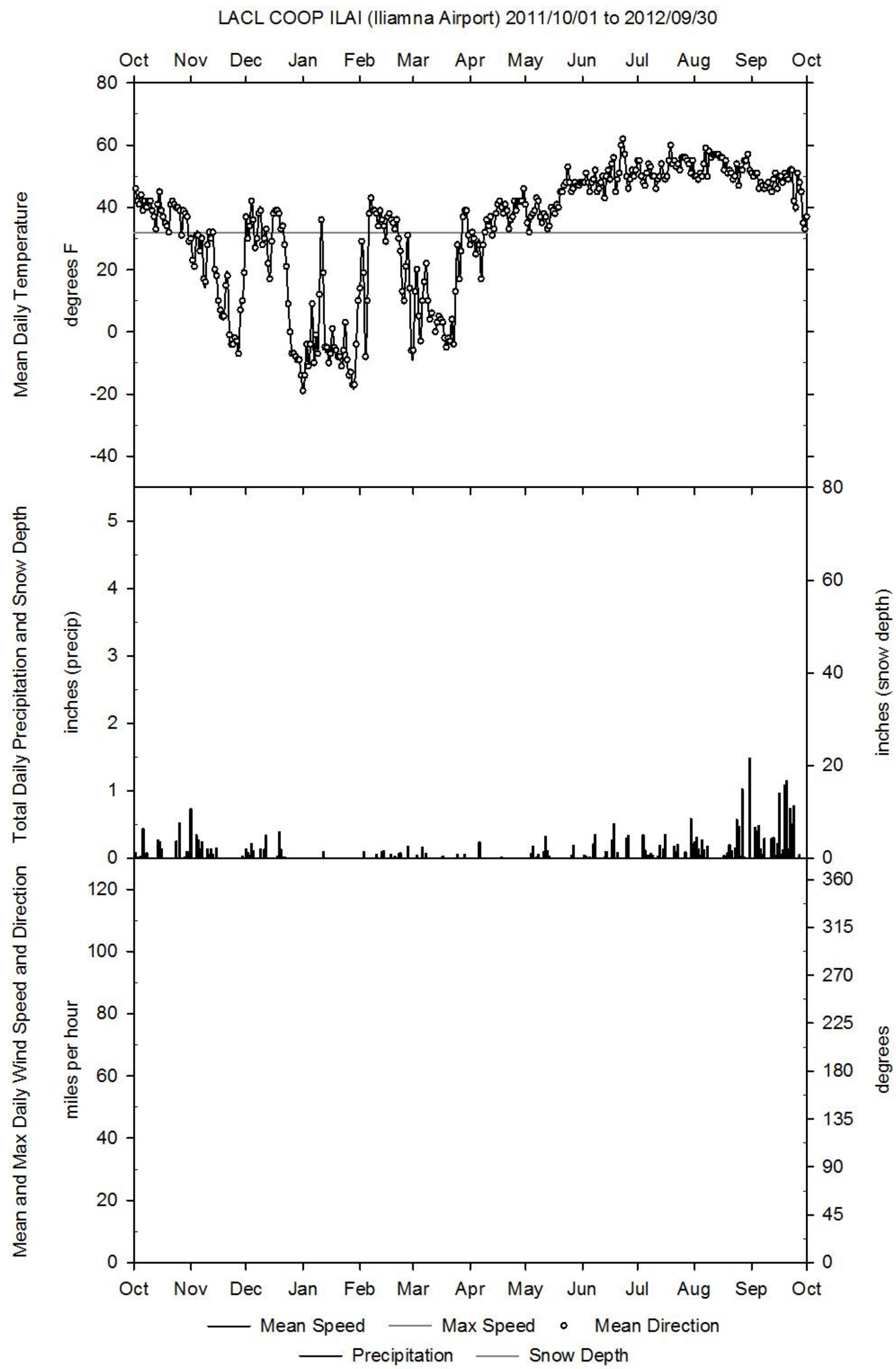
| 2012 Hydrologic Year - LACL CMAN DRRI (Drift River Terminal) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 25.5 | 3.2 | 0.7 | -8.9 | 9.5 | 6.3 | 23.7 | 28.8 | 41.2 | 43.7 | 43.0 | 34.3 | -8.9 |
| Max. | 43.0 | 27.0 | 32.0 | 26.2 | 32.4 | 36.0 | 41.2 | 46.6 | 48.6 | 53.2 | 53.2 | 50.7 | 53.2 |
| Mean | 36.6 | 16.0 | 19.9 | 3.1 | 23.2 | 18.3 | 33.1 | 38.7 | 45.8 | 49.0 | 49.4 | 44.9 | 31.5 |
| # days <32 F | 3 | 30 | 30 | 31 | 28 | 29 | 12 | 2 | 0 | 0 | 0 | 0 | 165 |
| % valid obs | 100 | 100 | 96 | 100 | 100 | 94 | 99 | 100 | 99 | 100 | 100 | 100 | 198 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 33.6 | 13.8 | 4.3 | 0.7 | 18.5 | 15.4 | 32.2 | 37.2 | 45.9 | 50.0 | 51.6 | 43.2 | 0.7 |
| Max | 51.4 | 39.0 | 40.1 | 31.3 | 38.8 | 44.6 | 52.7 | 55.4 | 60.6 | 62.6 | 63.9 | 58.1 | 63.9 |
| Mean | 44.4 | 25.6 | 28.5 | 14.4 | 31.9 | 27.7 | 42.0 | 47.2 | 52.2 | 55.0 | 56.3 | 51.8 | 39.8 |
| # days <32 F | 0 | 22 | 17 | 31 | 10 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 102 |
| % valid obs | 100 | 100 | 96 | 100 | 100 | 94 | 99 | 100 | 99 | 100 | 100 | 100 | 198 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 40.1 | 20.6 | 24.2 | 8.7 | 27.5 | 23.2 | 37.5 | 42.4 | 48.1 | 51.6 | 52.8 | 48.3 | 35.5 |
| % valid obs | 100 | 100 | 96 | 100 | 100 | 94 | 99 | 100 | 99 | 100 | 100 | 100 | 198 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 11.1 | 11.6 | 11.2 | 8.8 | 11.9 | 8.2 | 7.2 | 10.4 | 10.2 | 9.6 | 8.2 | 13.2 | |
| % valid obs | 100 | 100 | 96 | 100 | 100 | 94 | 97 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | 48.8 | 46.5 | 45.6 | 43.8 | 42.1 | 28.0 | 33.3 | 34.2 | 34.2 | 36.5 | 42.7 | 51.9 | 51.9 |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |



LACL CMAN DRRI (Drift River Terminal) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL COOP ILAI (Iliamna Airport) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 23 | -11 | -21 | -22 | -16 | -16 | 10 | 22 | 35 | 38 | 39 | 23 | -22 |
| Max. | 42 | 30 | 38 | 32 | 40 | 36 | 37 | 43 | 49 | 51 | 51 | 49 | 51 |
| Mean | 32.2 | 8.0 | 15.4 | -10.0 | 19.5 | 2.4 | 27.5 | 34.4 | 41.9 | 46.2 | 47.2 | 40.9 | 25.5 |
| # days <32 F | 11 | 30 | 24 | 30 | 18 | 28 | 22 | 8 | 0 | 0 | 0 | 3 | 174 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 35 | -3 | -17 | -14 | 1 | 4 | 24 | 38 | 47 | 50 | 50 | 42 | -17 |
| Max | 53 | 43 | 46 | 41 | 47 | 46 | 56 | 62 | 76 | 76 | 70 | 59 | 76 |
| Mean | 45.1 | 23.1 | 25.9 | 4.1 | 33.4 | 21.9 | 43.6 | 49.0 | 59.0 | 58.2 | 59.6 | 52.6 | 39.7 |
| # days <32 F | 0 | 18 | 11 | 28 | 5 | 23 | 2 | 0 | 0 | 0 | 0 | 0 | 87 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 38.6 | 15.6 | 20.7 | -3.0 | 26.4 | 12.1 | 35.7 | 41.7 | 50.4 | 52.3 | 53.3 | 46.8 | 32.6 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 97 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 35.1 | 24.2 | 16.8 | 16.3 | 18.6 | 22.0 | 32.1 | 43.0 | 51.1 | 55.4 | 54.6 | 47.9 | 34.8 |
| 1981-2010 | 35.1 | 24.7 | 20.8 | 17.5 | 19.7 | 23.5 | 33.1 | 44.0 | 51.7 | 56.1 | 54.8 | 48.0 | 35.8 |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 3.02 | 1.71 | 1.66 | 0.11 | 0.80 | 0.45 | 0.27 | 1.14 | 2.26 | 2.97 | 5.24 | 8.21 | 27.85 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 3.08 | 1.99 | 1.55 | 1.28 | 1.13 | 1.09 | 1.05 | 1.17 | 1.52 | 2.70 | 4.59 | 4.41 | 25.56 |
| 1981-2010 | 3.22 | 2.13 | 1.52 | 1.27 | 1.06 | 0.78 | 0.85 | 1.17 | 1.33 | 2.88 | 4.16 | 4.56 | 24.93 |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean[1] | 0 | 2 | 4 | 8 | 9 | 10 | 7 | 1 | 0 | 0 | 0 | 0 | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

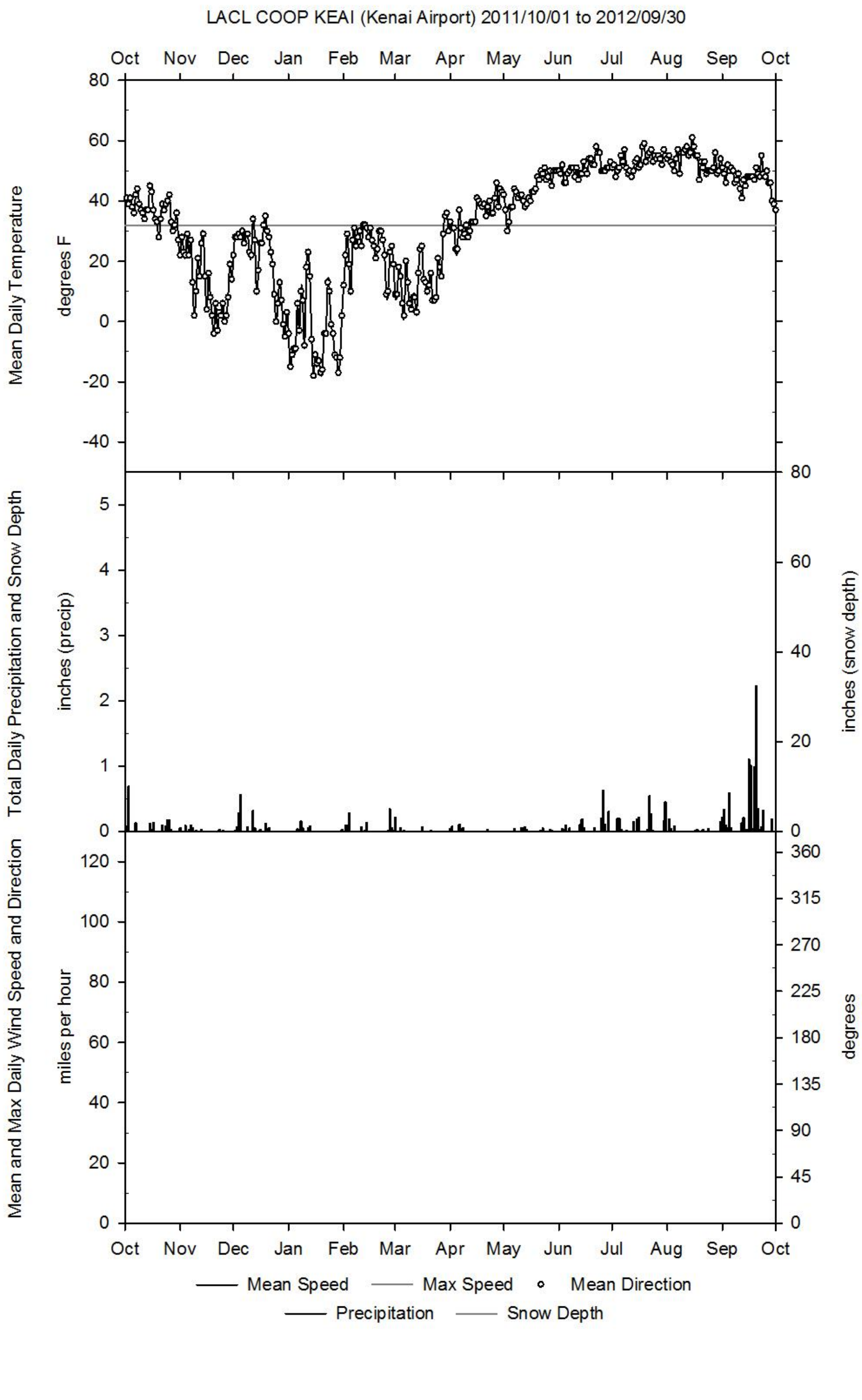
[1]Period of record used: 11/10/1939 to 09/30/2012



LACL COOP ILAI (Iliamna Airport) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL COOP KEAI (Kenai Airport) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 17 | -16 | -16 | -31 | -6 | -17 | 11 | 21 | 37 | 35 | 33 | 27 | -31 |
| Max. | 40 | 27 | 33 | 13 | 27 | 31 | 36 | 46 | 50 | 52 | 52 | 50 | 52 |
| Mean | 29.5 | 3.8 | 12.0 | -14.6 | 17.4 | 3.2 | 25.9 | 35.5 | 44.1 | 45.7 | 45.4 | 41.1 | 24.1 |
| # days <32 F | 16 | 30 | 30 | 31 | 29 | 31 | 22 | 8 | 0 | 0 | 0 | 4 | 201 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 27 | 8 | 4 | -6 | 20 | 15 | 34 | 40 | 50 | 53 | 53 | 44 | -6 |
| Max | 50 | 36 | 42 | 34 | 41 | 45 | 57 | 60 | 69 | 73 | 70 | 61 | 73 |
| Mean | 43.7 | 22.0 | 27.1 | 8.0 | 30.7 | 27.6 | 44.9 | 51.5 | 58.0 | 60.7 | 60.9 | 53.1 | 40.7 |
| # days <32 F | 1 | 23 | 16 | 30 | 12 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 106 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 36.5 | 12.9 | 19.6 | -3.2 | 24.2 | 15.5 | 35.3 | 43.6 | 50.9 | 53.3 | 53.3 | 47.1 | 32.4 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 35.0 | 21.8 | 15.0 | 12.5 | 17.5 | 22.8 | 34.6 | 44.3 | 50.9 | 54.8 | 53.9 | 47.2 | 34.2 |
| 1981-2010 | 35.2 | 23.2 | 19.0 | 16.4 | 19.7 | 25.7 | 36.2 | 46.0 | 52.5 | 56.3 | 55.0 | 48.1 | 36.2 |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 1.80 | 0.39 | 1.67 | 0.43 | 1.34 | 0.24 | 0.30 | 0.39 | 1.87 | 2.50 | 0.82 | 7.85 | 19.59 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean[1] | 2.44 | 1.50 | 1.34 | 0.99 | 0.96 | 0.80 | 0.74 | 0.89 | 1.21 | 1.89 | 2.61 | 3.33 | 18.71 |
| 1981-2010 | 2.63 | 1.38 | 1.35 | 0.96 | 0.88 | 0.64 | 0.59 | 0.91 | 1.07 | 1.84 | 2.69 | 3.27 | 18.21 |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

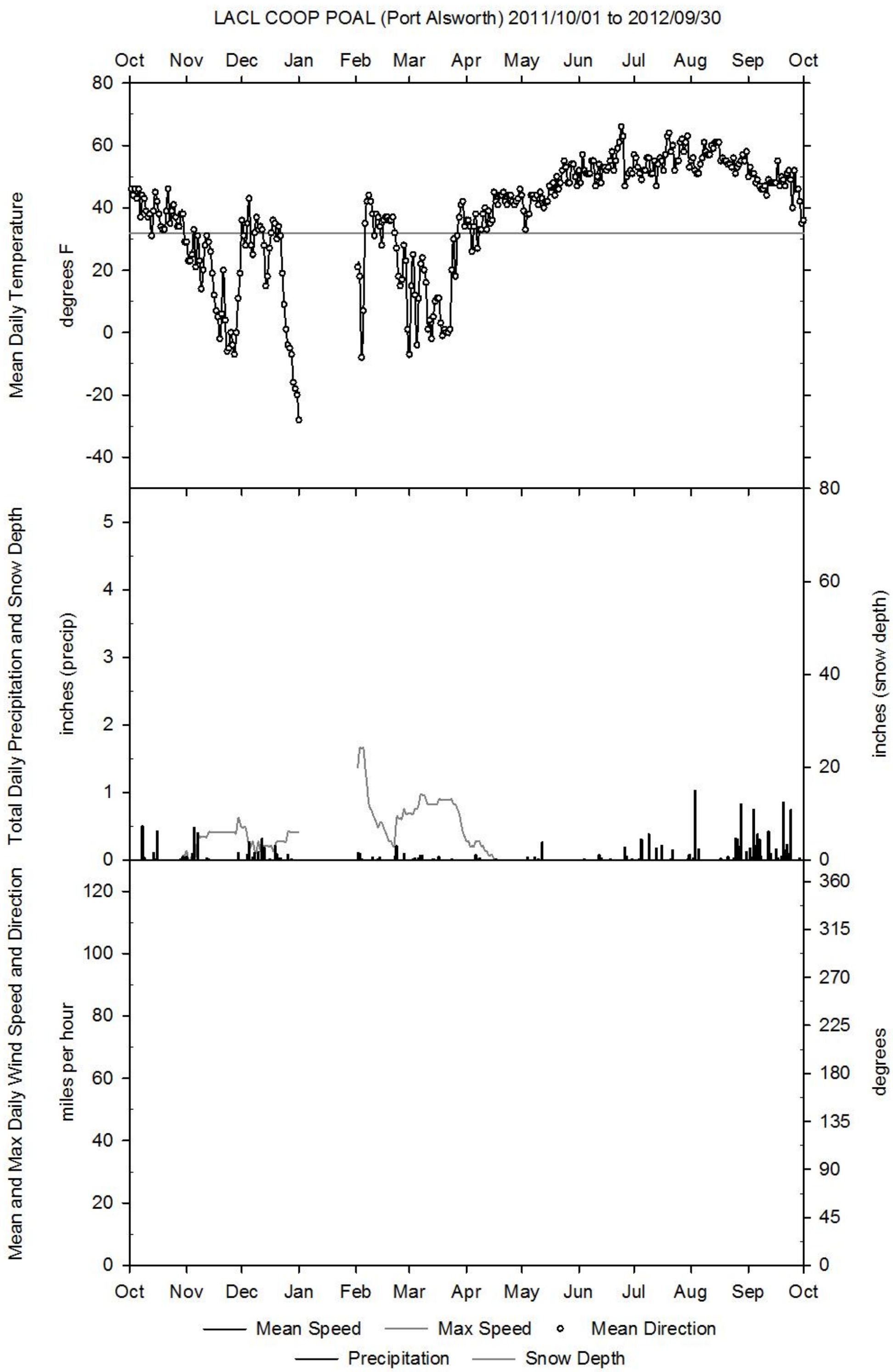
[1]Period of record used: 09/03/1949 tp 09/30/2012



LACL COOP KEAI (Kenai Airport) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

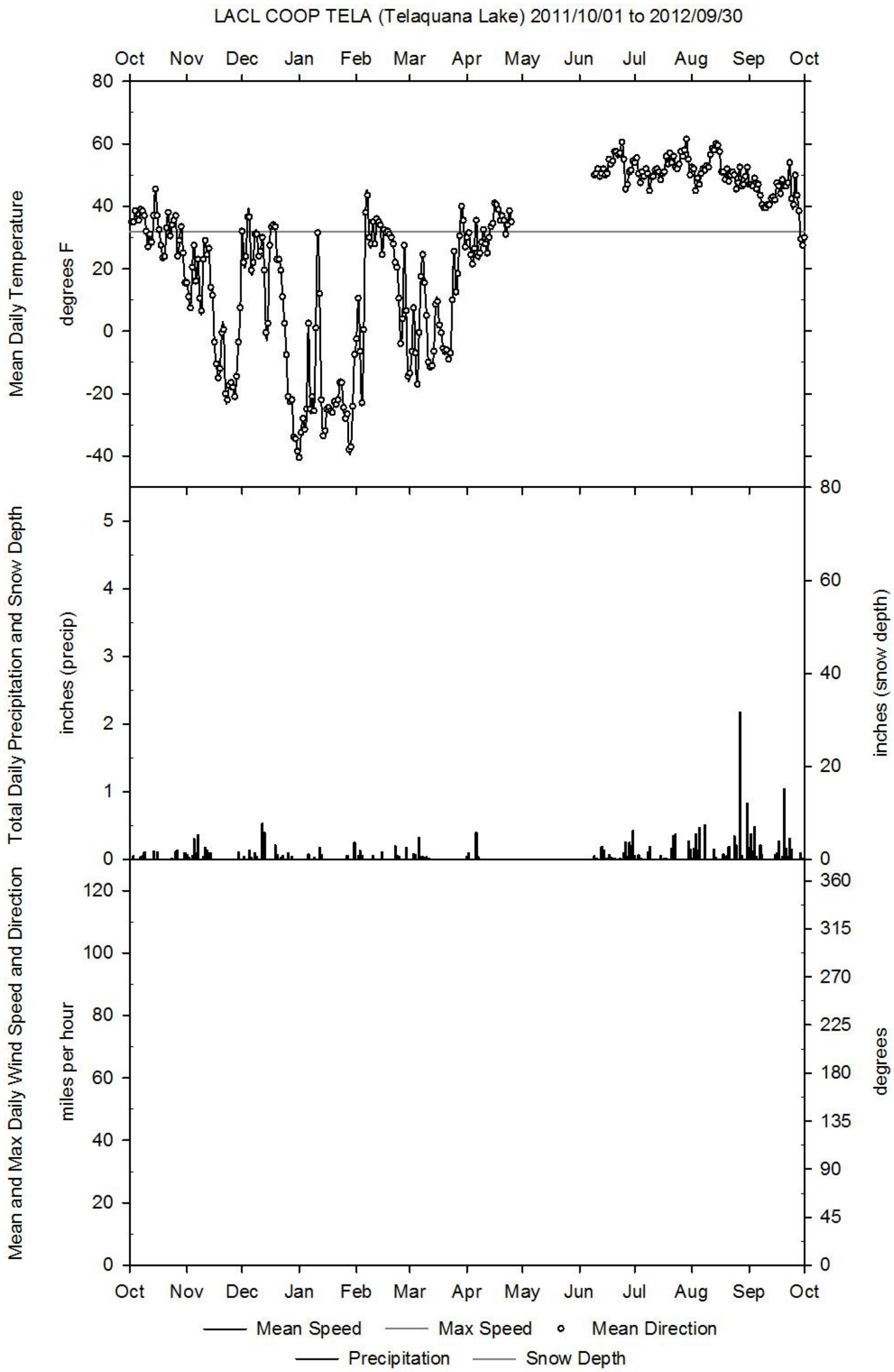
| 2012 Hydrologic Year - LACL COOP POAL (Port Alsworth) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 21 | -14 | -32 | | -19 | -18 | 15 | 21 | 33 | 40 | 40 | 23 | -32 |
| Max. | 43 | 30 | 36 | | 41 | 38 | 39 | 48 | 50 | 54 | 53 | 52 | 54 |
| Mean | 32.0 | 8.6 | 13.3 | | 20.4 | 5.2 | 28.4 | 36.8 | 41.3 | 47.1 | 46.2 | 40.9 | 29.2 |
| # days <32 F | 14 | 30 | 27 | | 17 | 28 | 20 | 6 | 0 | 0 | 0 | 4 | 146 |
| % valid obs | 100 | 100 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 92 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 32 | -4 | -23 | | 2 | 9 | 33 | 45 | 51 | 55 | 55 | 43 | -23 |
| Max | 53 | 42 | 53 | | 47 | 47 | 59 | 66 | 82 | 79 | 74 | 60 | 82 |
| Mean | 45.3 | 21.1 | 23.7 | | 33.4 | 25.4 | 49.5 | 54.3 | 65.5 | 64.0 | 64.9 | 54.0 | 45.6 |
| # days <32 F | 0 | 22 | 14 | | 7 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 66 |
| % valid obs | 100 | 100 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 92 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 38.6 | 14.7 | 18.6 | | 26.9 | 15.3 | 39.1 | 45.7 | 53.6 | 55.6 | 55.7 | 47.3 | 37.4 |
| % valid obs | 100 | 100 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 92 |
| POR mean[1] | 34.5 | 23.6 | 16.7 | 14.1 | 17.3 | 22.3 | 34.1 | 44.9 | 53.2 | 57.1 | 55.2 | 47.4 | 35.0 |
| 1981-2010 | 34.5 | 23.8 | 19.4 | 15.5 | 18.6 | 24.3 | 35.2 | 46.0 | 54.3 | 57.9 | 55.5 | 47.4 | 36.1 |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 1.23 | 1.14 | 1.59 | | 0.69 | 0.33 | 0.13 | 0.37 | 0.41 | 1.36 | 3.12 | 4.78 | 15.14 |
| % valid obs | 100 | 100 | 100 | 0 | 100 | 100 | 17 | 16 | 23 | 29 | 36 | 60 | 57 |
| POR mean[1] | 1.63 | 1.40 | 1.11 | 0.82 | 0.69 | 0.70 | 0.57 | 0.52 | 1.14 | 1.59 | 2.39 | 2.35 | 14.91 |
| 1981-2010 | 1.50 | 1.46 | 0.91 | 0.81 | 0.82 | 0.66 | 0.49 | 0.41 | 0.74 | 1.33 | 1.89 | 2.21 | 13.23 |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 5.0 | 4.0 | | 11.0 | 11.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 100 | 100 | 100 | 0 | 100 | 100 | 50 | 3 | 100 | 100 | 100 | 100 | |
| POR mean | 0 | 3 | 6 | 6 | 6 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[1]Period of record used: 07/01/1962 to 07/31/2012


LACL COOP POAL (Port Alsworth) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

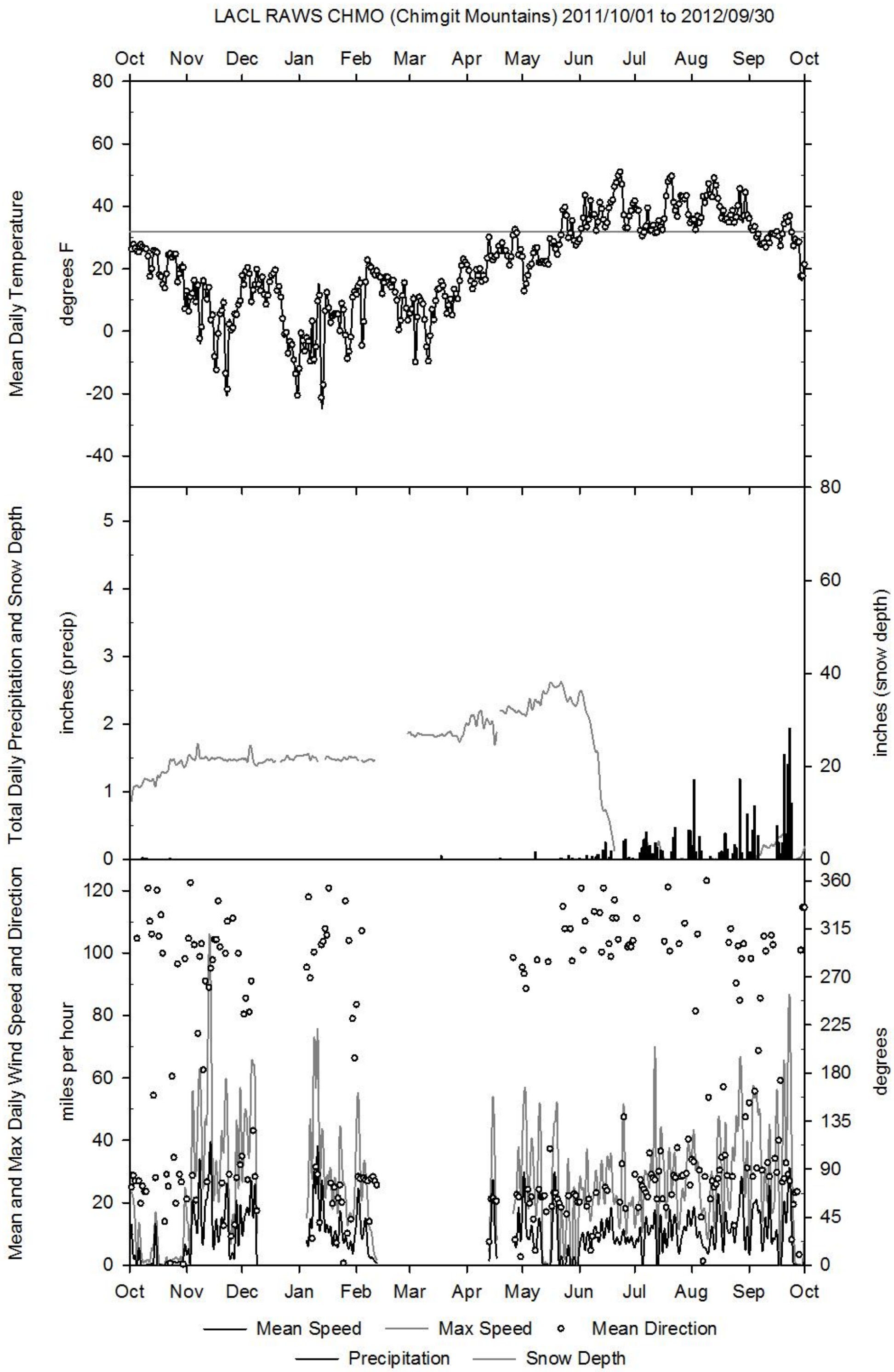
| 2012 Hydrologic Year - LACL COOP TELA (Telaquana Lake) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 6 | -27 | -45 | -45 | -35 | -28 | 8 | | 36 | 35 | 36 | 19 | -45 |
| Max. | 41 | 25 | 31 | 26 | 40 | 34 | 34 | 0 | 49 | 53 | 51 | 48 | 53 |
| Mean | 25.1 | -4.5 | 1.8 | -29.4 | 10.0 | -4.9 | 21.9 | | 44.1 | 45.0 | 43.6 | 36.4 | 16.5 |
| # days <32 F | 29 | 30 | 31 | 31 | 26 | 30 | 22 | 0 | 0 | 0 | 0 | 7 | 206 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 0 | 77 | 100 | 100 | 100 | 88 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 21 | -17 | -36 | -31 | -11 | -6 | 28 | 0 | 47 | 49 | 49 | 31 | -36 |
| Max | 50 | 39 | 52 | 38 | 47 | 47 | 50 | | 76 | 75 | 72 | 60 | 76 |
| Mean | 38.8 | 12.3 | 18.2 | -10.6 | 28.5 | 18.7 | 42.0 | | 61.6 | 60.1 | 59.1 | 49.6 | 33.6 |
| # days <32 F | 6 | 24 | 18 | 29 | 11 | 25 | 3 | 0 | 0 | 0 | 0 | 2 | 118 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 0 | 77 | 100 | 100 | 100 | 88 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 32.0 | 3.9 | 10.0 | -20.0 | 19.2 | 6.9 | 32.0 | | 52.8 | 52.6 | 51.4 | 43.0 | 25.0 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 0 | 77 | 100 | 100 | 100 | 88 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 0.94 | 1.53 | 1.78 | 0.67 | 0.88 | 0.68 | 0.54 | | 1.92 | 1.85 | 5.92 | 3.59 | 20.30 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 80 | 0 | 77 | 100 | 100 | 100 | 88 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[2]Total precipitation (rain and snow water equivalent) reported for the 2012 hydrologic year.


LACL COOP TELA (Telaquana Lake) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL RAWS CHMO (Chigmit Mountains) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 4.3 | -33.0 | -26.1 | -30.3 | -18.0 | -19.3 | 4.6 | 6.4 | 26.1 | 27.7 | 31.1 | 14.2 | -33.0 |
| Max. | 26.2 | 12.6 | 17.4 | 10.9 | 21.7 | 19.0 | 27.5 | 32.4 | 48.0 | 42.1 | 44.4 | 34.9 | 48.0 |
| Mean | 18.4 | -1.5 | 4.0 | -7.6 | 7.5 | 3.6 | 19.0 | 22.6 | 34.0 | 34.5 | 35.6 | 26.9 | 16.4 |
| # days <32 F | 31 | 30 | 31 | 31 | 29 | 31 | 30 | 29 | 12 | 11 | 4 | 27 | 296 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 93 | 99 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 15.8 | -8.5 | -14.8 | -5.1 | 4.8 | -0.4 | 18.1 | 20.3 | 35.1 | 33.1 | 36.1 | 20.5 | -14.8 |
| Max | 35.1 | 22.6 | 25.5 | 20.3 | 24.1 | 31.5 | 46.9 | 61.2 | 60.8 | 57.9 | 57.0 | 40.1 | 61.2 |
| Mean | 26.0 | 12.6 | 12.3 | 8.8 | 17.6 | 17.7 | 29.0 | 33.0 | 47.3 | 42.2 | 44.6 | 32.8 | 27.0 |
| # days <32 F | 28 | 30 | 31 | 31 | 29 | 31 | 23 | 17 | 0 | 0 | 0 | 10 | 230 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 94 | 99 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 21.8 | 5.0 | 8.1 | 1.0 | 13.0 | 9.2 | 23.0 | 26.5 | 39.2 | 37.9 | 39.4 | 29.7 | 21.1 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 94 | 99 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 0.07 | | | | | 0.05 | 0.02 | 0.26 | 1.39 | 4.14 | 5.13 | 8.82 | 19.88 |
| % valid obs | 3 | 0 | 0 | 0 | 0 | 0 | 11 | 25 | 94 | 93 | 100 | 42 | 31 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 18.0 | 21.8 | 21.6 | 21.8 | 22.3 | 26.8 | 30.9 | 34.9 | 19.8 | 2.1 | 0.7 | 2.9 | |
| % valid obs | 93 | 91 | 81 | 88 | 28 | 96 | 87 | 100 | 62 | 31 | 3 | 62 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 1.9 | 14.3 | 19.1 | 13.1 | 8.9 | | 12.5 | 6.9 | 9.5 | 10.4 | 11.6 | 10.8 | |
| % valid obs | 100 | 100 | 23 | 89 | 35 | 0 | 32 | 100 | 100 | 98 | 100 | 94 | |
| Max speed | 24.6 | 101.3 | 64.0 | 75.4 | 54.8 | | 53.9 | 55.0 | 50.8 | 69.4 | 65.8 | 85.2 | 101.3 |
| Max direction | 287 | 288 | 274 | 101 | 86 | | 69 | 277 | 78 | 65 | 241 | 69 | 288 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 42.7 | 16.2 | 5.9 | 15.2 | 28.6 | 96.5 | 159.5 | 207.0 | 225.6 | 169.7 | 132.0 | 73.0 | 1172.0 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98 | 100 | 94 | 99 |

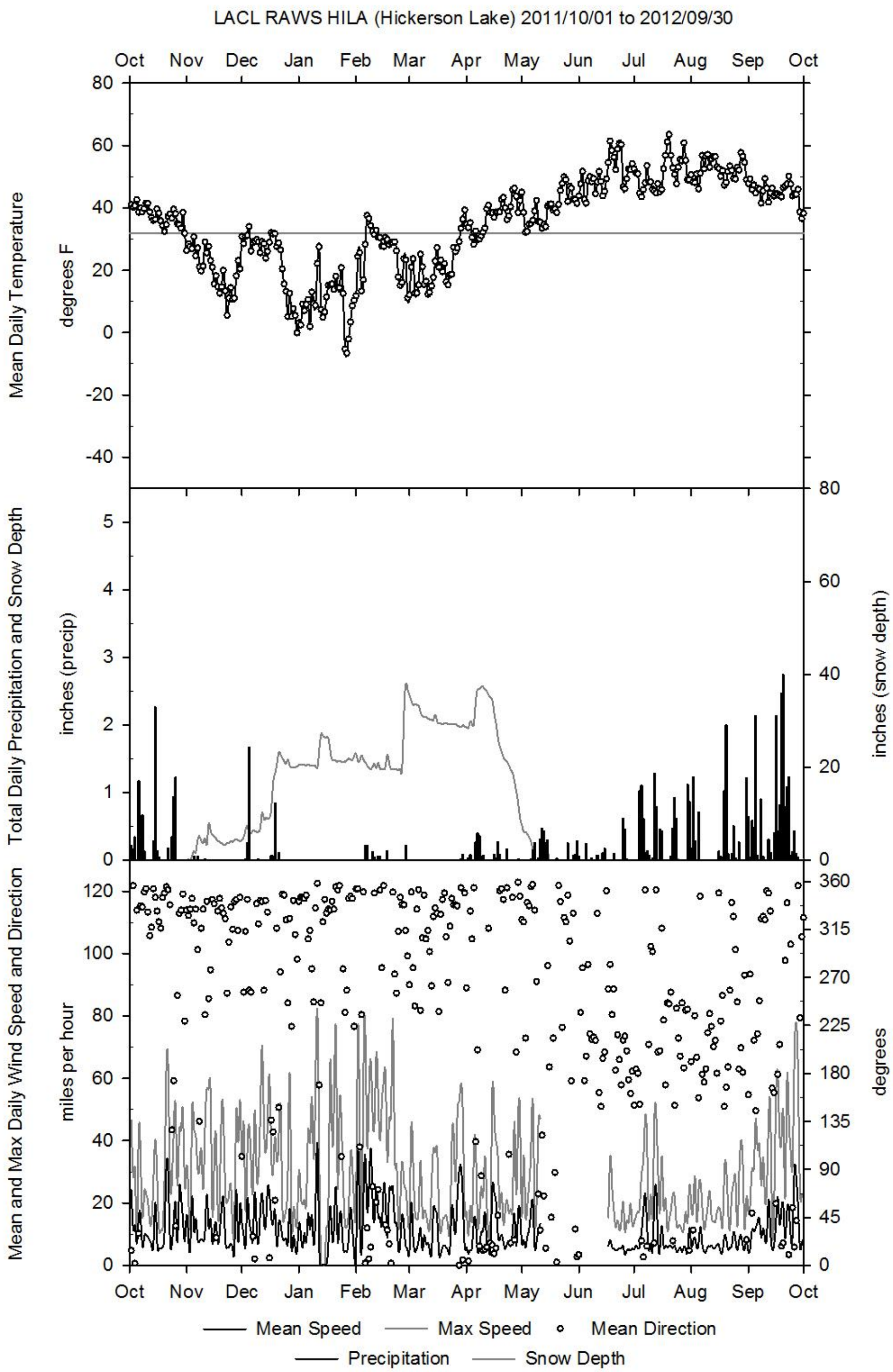
[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.



LACL RAWS CHMO (Chimgit Mountains) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

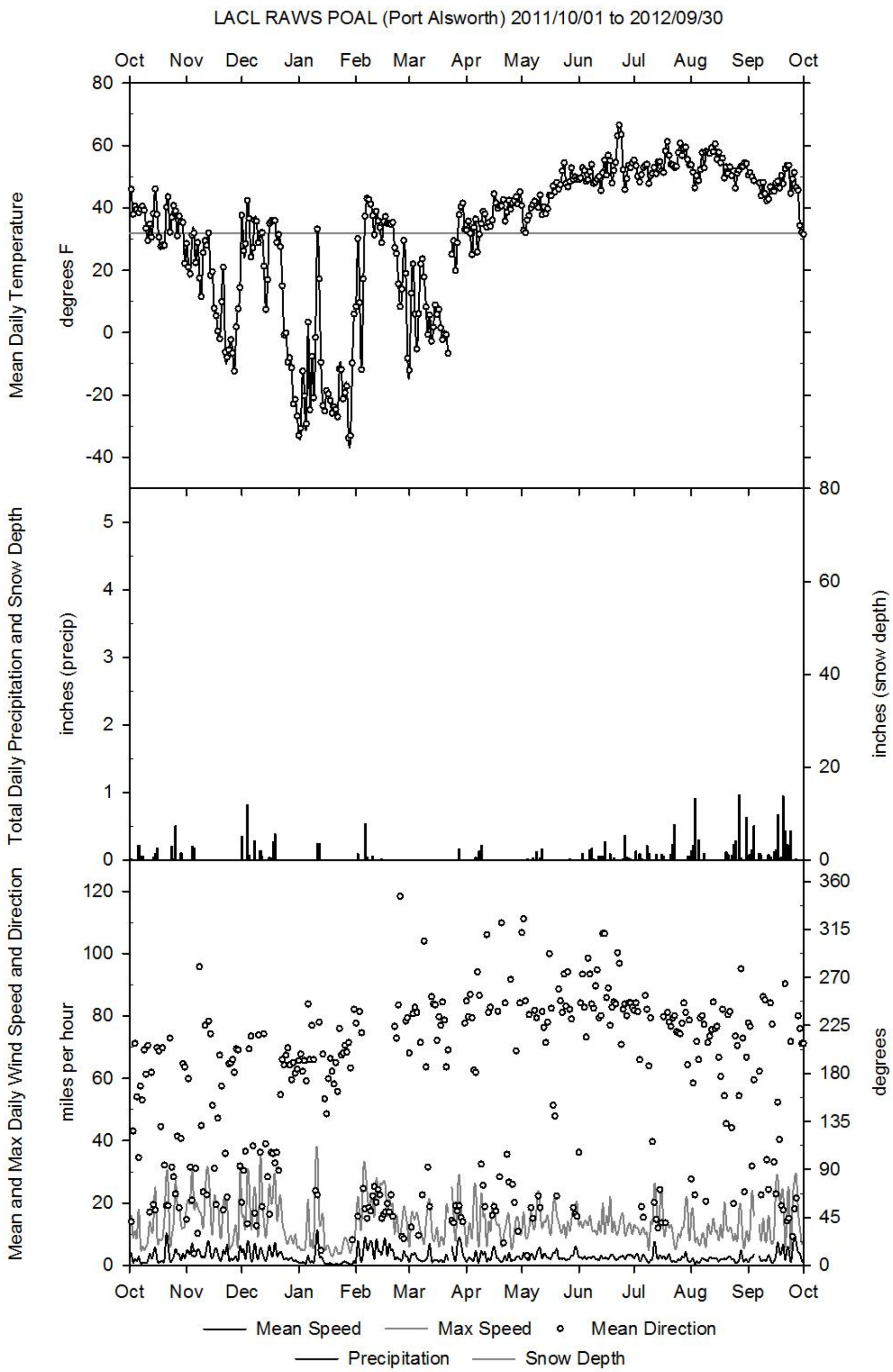
| 2012 Hydrologic Year - LACL RAWS HILA (Hickerson Lake) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 24.6 | 1.6 | -4.0 | -9.6 | 3.2 | 3.6 | 22.8 | 25.7 | 37.2 | 39.4 | 41.9 | 30.6 | -9.6 |
| Max. | 38.5 | 26.2 | 29.7 | 17.2 | 34.9 | 31.6 | 40.8 | 42.6 | 50.4 | 53.2 | 51.3 | 47.7 | 53.2 |
| Mean | 33.9 | 15.4 | 18.4 | 4.0 | 21.1 | 16.6 | 32.3 | 34.6 | 43.5 | 45.9 | 47.2 | 41.3 | 29.5 |
| # days <32 F | 8 | 30 | 31 | 31 | 27 | 31 | 12 | 11 | 0 | 0 | 0 | 1 | 182 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 28.0 | 11.5 | 4.6 | -2.9 | 18.1 | 17.6 | 34.5 | 37.0 | 47.3 | 46.8 | 47.1 | 43.9 | -2.9 |
| Max | 52.9 | 38.1 | 39.2 | 32.7 | 42.1 | 48.6 | 57.6 | 62.6 | 74.5 | 72.3 | 67.6 | 59.5 | 74.5 |
| Mean | 41.9 | 25.7 | 26.7 | 16.2 | 31.3 | 29.4 | 45.4 | 46.7 | 59.4 | 56.9 | 58.9 | 50.1 | 40.7 |
| # days <32 F | 1 | 24 | 19 | 30 | 11 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 108 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 37.3 | 20.2 | 22.4 | 10.0 | 25.9 | 21.9 | 37.6 | 40.1 | 50.9 | 50.9 | 52.2 | 44.9 | 34.5 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 8.10 | 0.16 | 3.02 | 0.00 | 1.08 | 0.11 | 1.94 | 2.94 | 1.83 | 10.24 | 8.24 | 17.50 | 55.16 |
| % valid obs | 95 | 9 | 23 | 3 | 32 | 16 | 89 | 97 | 99 | 100 | 100 | 99 | 64 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.0 | 3.8 | 13.9 | 22.2 | 22.4 | 30.3 | 26.6 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 100 | 100 | 97 | 100 | 98 | 100 | 100 | 100 | 55 | 3 | 2 | 1 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 12.9 | 11.6 | 12.9 | 10.4 | 17.6 | 11.1 | 10.5 | 11.0 | 5.4 | 8.6 | 6.7 | 13.3 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 32 | 48 | 100 | 100 | 100 | |
| Max speed | 63.3 | 56.8 | 70.5 | 81.7 | 79.0 | 58.4 | 56.6 | 52.6 | 35.1 | 47.9 | 40.0 | 77.6 | 81.7 |
| Max direction | 353 | 347 | 358 | 350 | 52 | 351 | 356 | 2 | 297 | 358 | 243 | 33 | 350 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 39.2 | 16.0 | 6.1 | 12.3 | 30.7 | 92.3 | 146.0 | 175.5 | 186.0 | 135.1 | 120.4 | 60.9 | 1020.4 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.


LACL RAWS HILA (Hickerson Lake) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL RAWS POAL (Port Alsworth) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 16 | -19 | -35 | -43 | -30 | -22 | 8 | 13 | 27 | 35 | 35 | 18 | -43 |
| Max. | 43 | 32 | 34 | 23 | 38 | 36 | 38 | 41 | 47 | 52 | 50 | 52 | 52 |
| Mean | 26.8 | 3.6 | 9.7 | -24.3 | 15.4 | -0.1 | 23.9 | 31.5 | 39.9 | 44.4 | 43.6 | 38.6 | 21.0 |
| # days <32 F | 23 | 29 | 28 | 31 | 23 | 29 | 27 | 14 | 4 | 0 | 0 | 7 | 215 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 94 | 100 | 100 | 100 | 100 | 100 | 76 | 98 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 28 | -6 | -30 | -22 | 1 | 8 | 35 | 40 | 50 | 50 | 49 | 38 | -30 |
| Max | 54 | 43 | 53 | 42 | 49 | 54 | 62 | 69 | 83 | 80 | 76 | 62 | 83 |
| Mean | 44.4 | 20.2 | 22.3 | -2.3 | 33.6 | 26.7 | 51.0 | 55.2 | 65.6 | 63.4 | 63.4 | 54.0 | 41.4 |
| # days <32 F | 1 | 22 | 16 | 29 | 8 | 21 | 0 | 0 | 0 | 0 | 0 | 2 | 99 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 94 | 100 | 100 | 100 | 100 | 100 | 76 | 98 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 35.7 | 13.2 | 16.3 | -14.8 | 25.7 | 14.2 | 37.7 | 44.0 | 52.6 | 54.0 | 53.5 | 45.5 | 31.2 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 94 | 100 | 100 | 100 | 100 | 100 | 76 | 98 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 1.51 | 0.72 | 2.07 | 0.48 | 0.74 | 0.17 | 0.42 | 0.43 | 1.50 | 1.85 | 4.02 | 4.34 | 18.25 |
| % valid obs | 71 | 13 | 32 | 2 | 52 | 18 | 69 | 88 | 98 | 100 | 100 | 70 | 59 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 2.8 | 3.9 | 3.4 | 1.5 | 4.6 | 3.0 | 2.6 | 3.2 | 2.6 | 2.5 | 1.9 | 3.4 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 94 | 100 | 100 | 100 | 100 | 100 | 76 | |
| Max speed | 29.0 | 31.0 | 35.0 | 36.0 | 31.0 | 29.0 | 24.0 | 24.0 | 22.0 | 26.0 | 20.0 | 29.0 | 36.0 |
| Max direction | 75 | 33 | 129 | 61 | 74 | 63 | 140 | 60 | 37 | 50 | 118 | 58 | 61 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 39.4 | 9.2 | 2.2 | 3.3 | 17.6 | 62.3 | 143.1 | 170.7 | 164.5 | 124.0 | 106.1 | 58.9 | 901.1 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 94 | 100 | 100 | 100 | 100 | 100 | 76 | 97 |

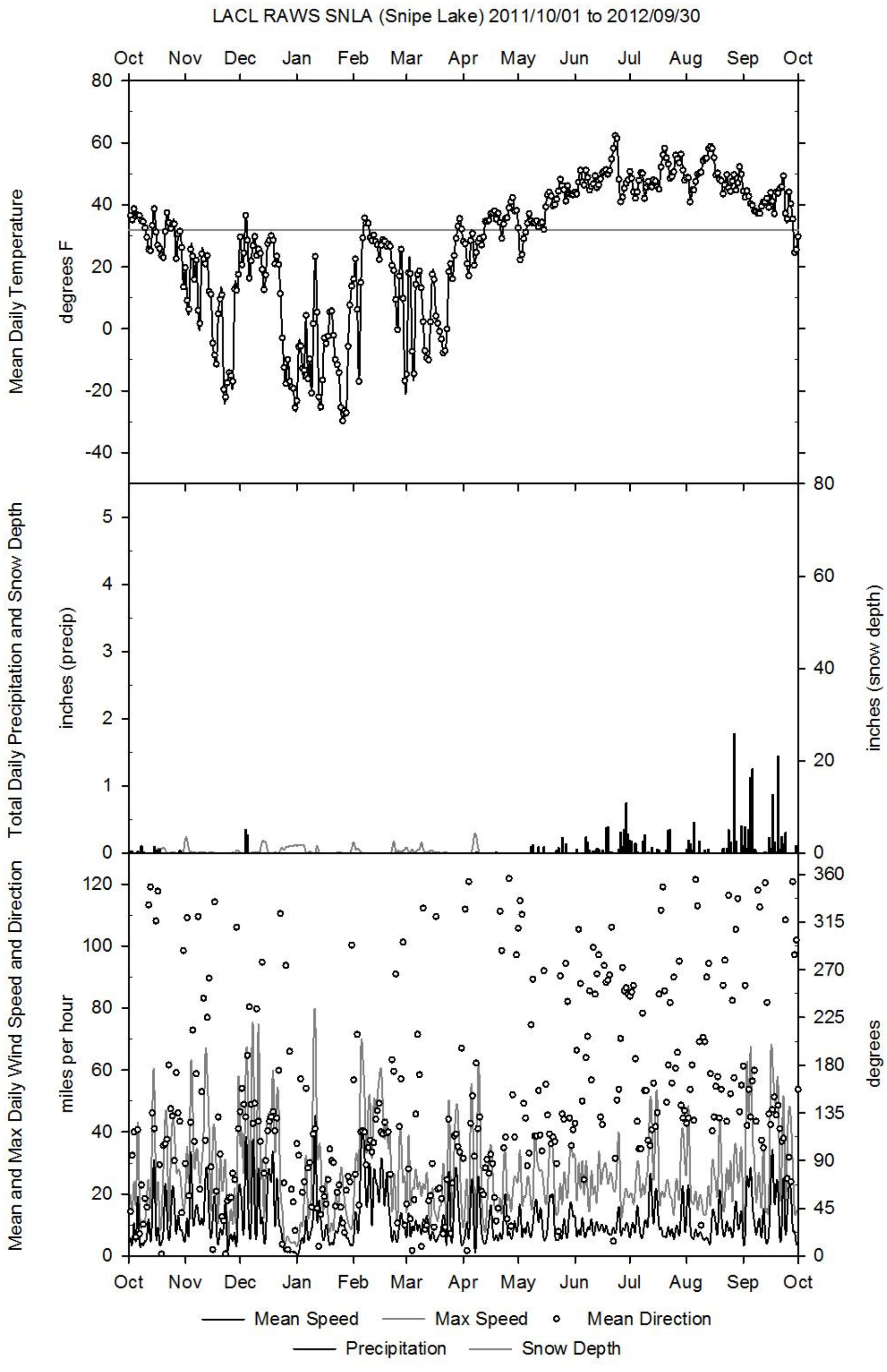
[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.



LACL RAWS POAL (Port Alsworth) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL RAWS SNLA (Snipe Lake) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | 8.6 | -24.5 | -29.9 | -32.8 | -22.4 | -20.7 | 9.1 | 14.4 | 32.0 | 37.8 | 38.1 | 21.7 | -32.8 |
| Max. | 34.7 | 25.0 | 30.6 | 16.2 | 34.3 | 30.7 | 35.1 | 41.9 | 52.3 | 50.5 | 51.6 | 45.9 | 52.3 |
| Mean | 25.2 | -1.3 | 6.8 | -14.9 | 12.6 | 2.8 | 25.8 | 32.0 | 41.8 | 43.9 | 43.6 | 34.5 | 21.1 |
| # days <32 F | 25 | 30 | 31 | 31 | 28 | 31 | 25 | 15 | 0 | 0 | 0 | 8 | 224 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 15.8 | -18.0 | -17.7 | -27.9 | -12.3 | -7.6 | 24.1 | 27.1 | 43.0 | 44.8 | 43.2 | 27.0 | -27.9 |
| Max | 45.5 | 32.7 | 42.8 | 31.3 | 38.8 | 41.4 | 49.6 | 56.1 | 72.7 | 68.4 | 71.6 | 53.8 | 72.7 |
| Mean | 36.9 | 13.8 | 17.4 | 0.6 | 25.3 | 16.9 | 39.1 | 45.5 | 58.0 | 56.2 | 56.8 | 45.7 | 34.3 |
| # days <32 F | 6 | 29 | 25 | 31 | 22 | 25 | 4 | 1 | 0 | 0 | 0 | 1 | 144 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 30.7 | 6.4 | 12.0 | -7.3 | 19.3 | 10.1 | 32.4 | 38.2 | 49.2 | 49.4 | 49.4 | 39.5 | 27.4 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[2] | 0.54 | 0.00 | 0.60 | 0.00 | 0.00 | 0.01 | 0.05 | 0.89 | 3.54 | 1.79 | 4.22 | 6.94 | 18.58 |
| % valid obs | 59 | 2 | 8 | 0 | 14 | 9 | 64 | 85 | 100 | 100 | 100 | 90 | 53 |
| POR mean 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | 0.3 | 0.2 | 0.7 | 0.4 | 0.4 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| % valid obs | 100 | 100 | 96 | 100 | 100 | 100 | 100 | 100 | 58 | 52 | 25 | 22 | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 9.9 | 12.4 | 13.3 | 9.0 | 17.6 | 10.4 | 9.9 | 10.9 | 8.8 | 11.2 | 9.6 | 14.4 | |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | |
| Max speed | 57.3 | 66.2 | 74.7 | 77.0 | 66.9 | 50.1 | 58.4 | 37.8 | 39.4 | 50.1 | 48.5 | 67.6 | 77.0 |
| Max direction | 117 | 124 | 126 | 122 | 133 | 123 | 118 | 106 | 115 | 112 | 113 | 112 | 122 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 39.1 | 14.2 | 5.0 | 11.0 | 30.8 | 90.1 | 137.9 | 164.2 | 142.8 | 121.9 | 99.1 | 54.3 | 910.6 |
| % valid obs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.

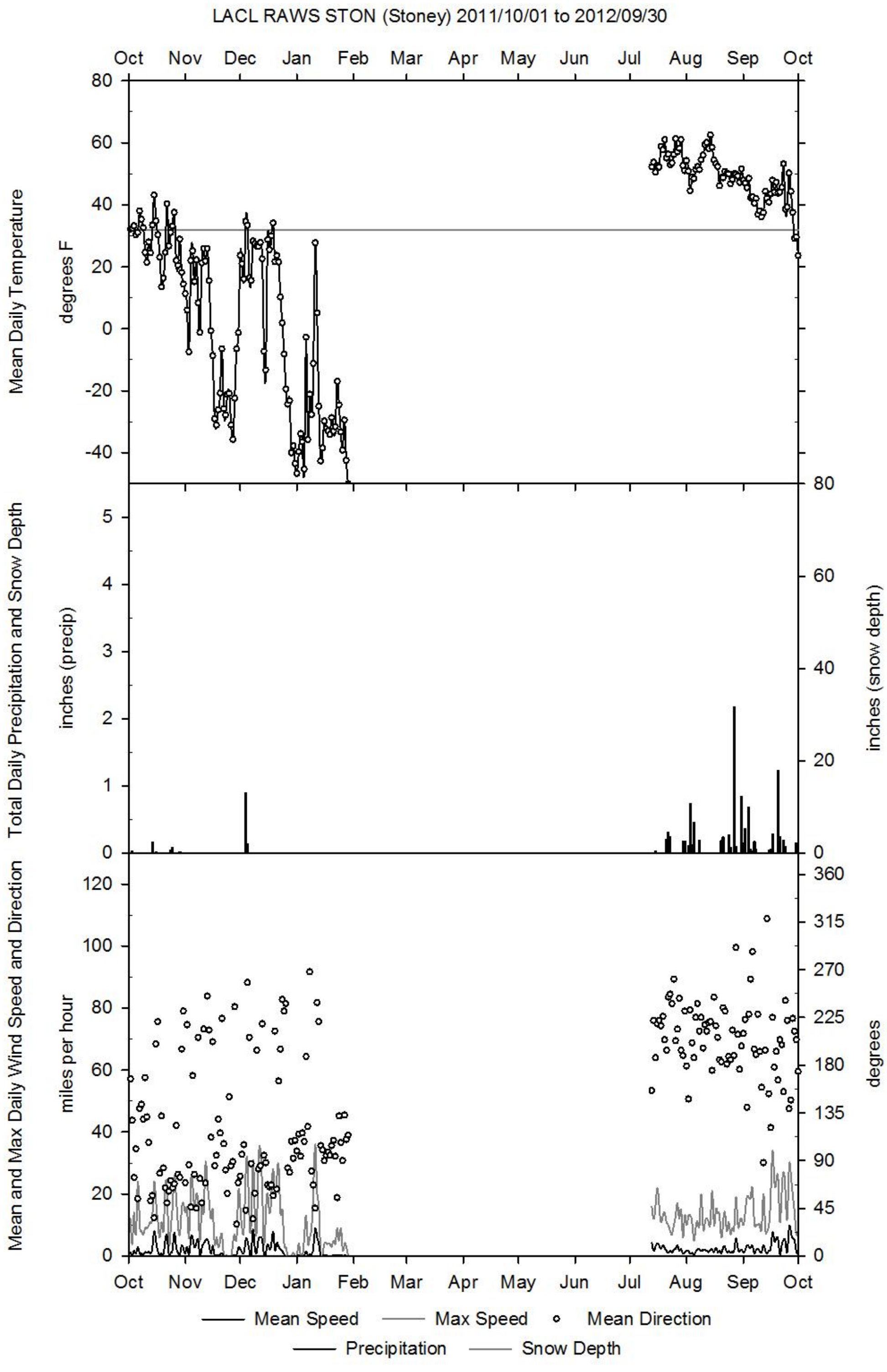


LACL RAWS SNLA (Snipe Lake) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL RAWS STON (Stoney) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | -12 | -42 | -50 | -52 | | | | | | 29 | 28 | 5 | -52 |
| Max. | 37 | 23 | 29 | 20 | | | | | | 53 | 46 | 48 | 53 |
| Mean | 14.2 | -16.2 | -3.5 | -38.5 | | | | | | 42.9 | 39.2 | 31.4 | 8.9 |
| # days <32 F | 30 | 30 | 31 | 28 | | | | | | 1 | 5 | 15 | 140 |
| % valid obs | 100 | 100 | 100 | 87 | 0 | 0 | 0 | 0 | 0 | 63 | 100 | 100 | 55 |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | 21 | -18 | -34 | -50 | | | | | | 55 | 49 | 34 | -50 |
| Max | 54 | 32 | 49 | 33 | | | | | | 82 | 79 | 61 | 82 |
| Mean | 40.9 | 9.1 | 16.9 | -12.1 | | | | | | 66.6 | 64.2 | 52.0 | 32.9 |
| # days <32 F | 5 | 29 | 20 | 26 | | | | | | 0 | 0 | 0 | 80 |
| % valid obs | 100 | 100 | 100 | 87 | 0 | 0 | 0 | 0 | 0 | 63 | 100 | 100 | 55 |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | 27.9 | -3.1 | 7.4 | -27.4 | | | | | | 55.5 | 51.7 | 41.5 | 21.0 |
| % valid obs | 100 | 100 | 100 | 87 | 0 | 0 | 0 | 0 | 0 | 63 | 100 | 100 | 55 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total | 0.37 | 0.00 | 1.04 | 0.00 | | | | | | 1.16 | 5.68 | 3.64 | 11.89 |
| % valid obs | 41 | 0 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 63 | 97 | 84 | 25 |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | 2.1 | 2.0 | 2.5 | 1.0 | | | | | | 2.2 | 1.8 | 3.4 | |
| % valid obs | 100 | 100 | 100 | 87 | 0 | 0 | 0 | 0 | 0 | 63 | 100 | 100 | |
| Max speed | 26.0 | 30.0 | 34.0 | 36.0 | | | | | | 22.0 | 21.0 | 34.0 | 36.0 |
| Max direction | 49 | 28 | 53 | 81 | | | | | | 105 | 188 | 329 | 81 |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | 35.2 | 2.9 | 2.1 | 4.5 | | | | | | 87.2 | 111.1 | 60.5 | 303.4 |
| % valid obs | 100 | 100 | 100 | 87 | 0 | 0 | 0 | 0 | 0 | 63 | 100 | 100 | 55 |

*Station was not operating 01/28/2012 to 07/12/2012. Yearly summaries reflect missing data.

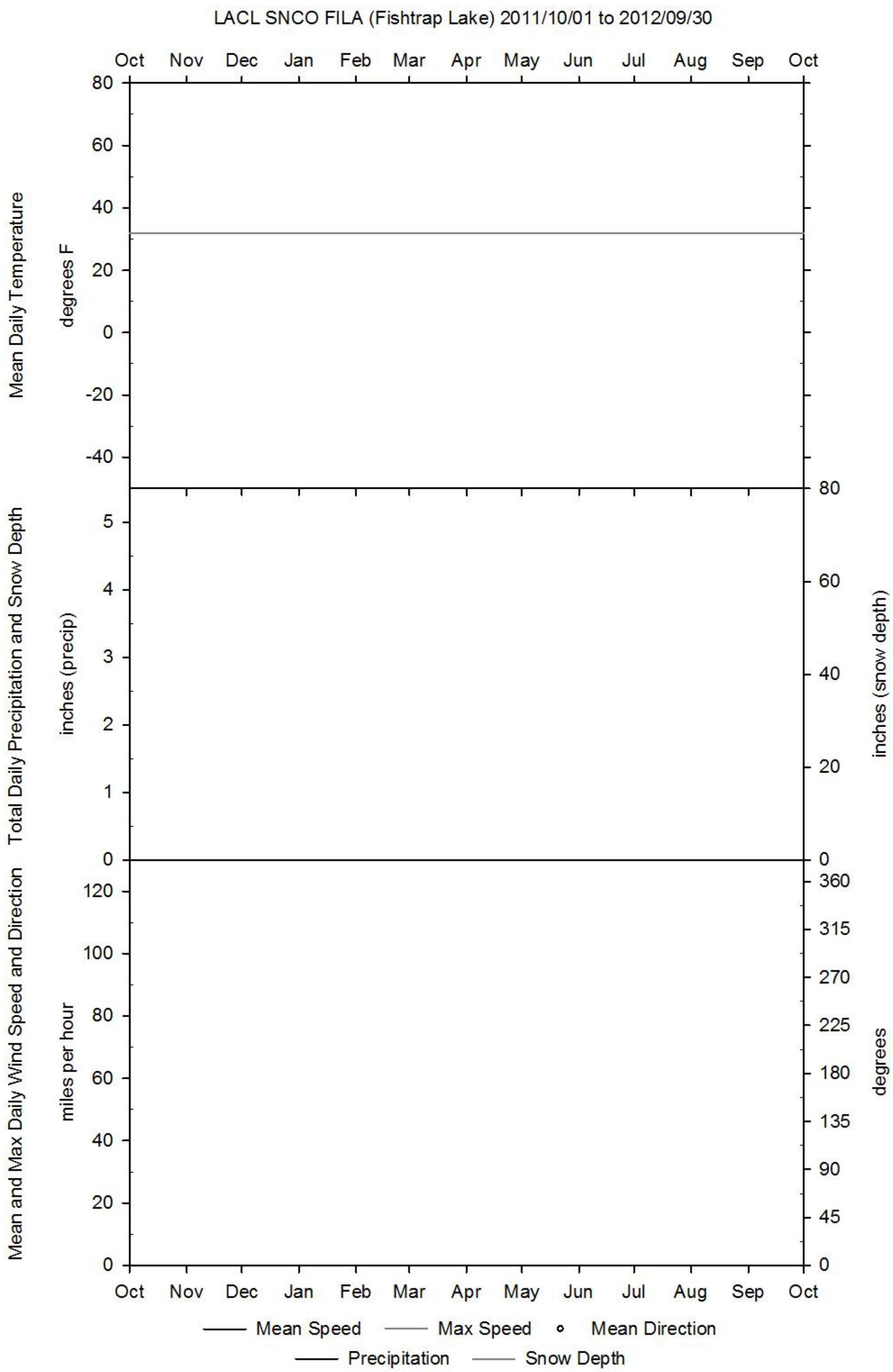
[2]Station is only capable of measuring liquid precipitation. Precipitation reported when maximum air temperature is below 31.1 °F is not considered valid and these data are not used for summarizing purposes. The water equivalent of solid precipitation (e.g. snowfall) is not measured and this is reflected in the percentage of valid observations that are reported as a measure of the reliability of cumulative values.



LACL RAWS STON (Stoney) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

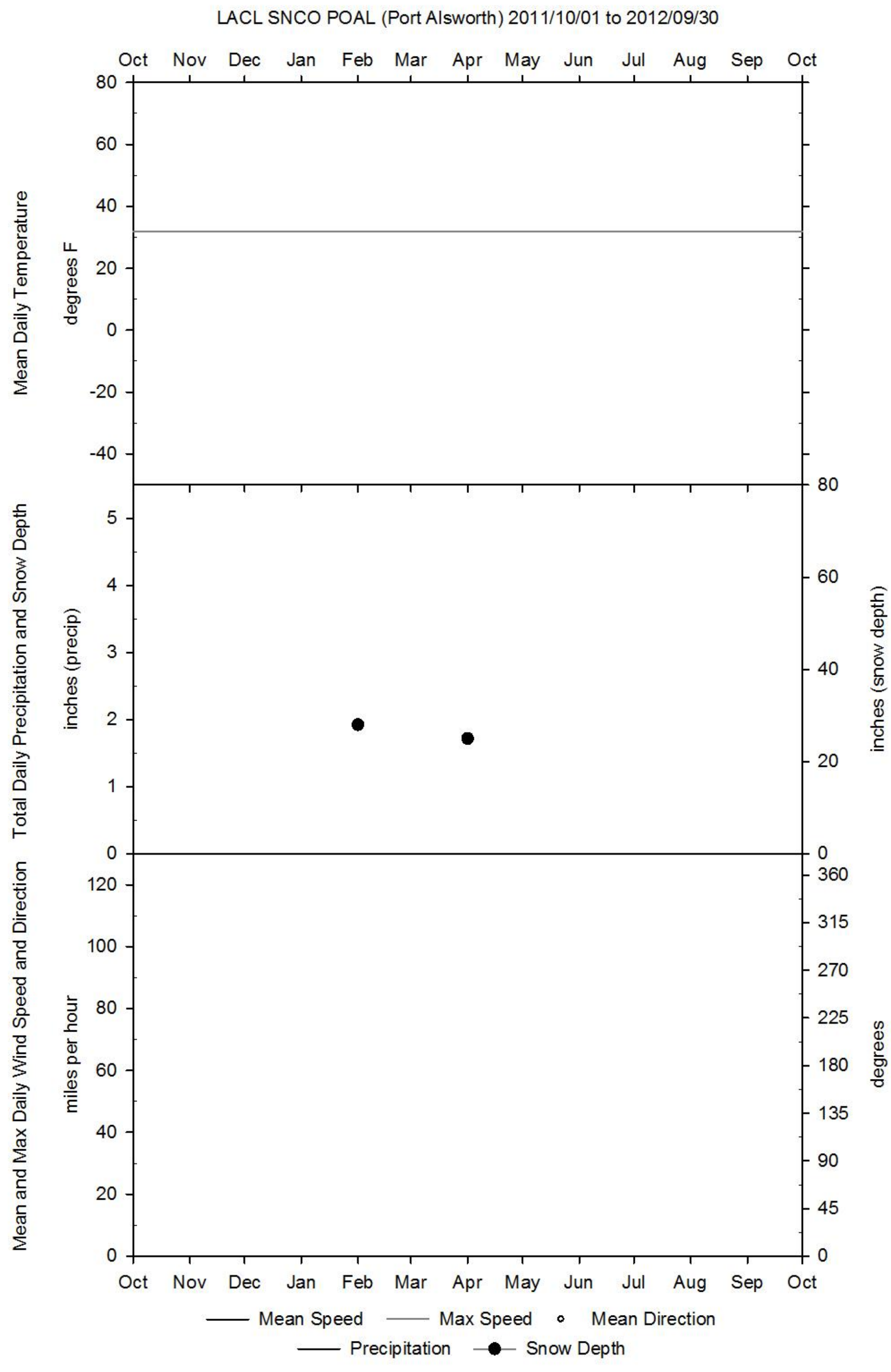
| 2012 Hydrologic Year - LACL SNCO FILA (Fishtrap Lake) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Year** |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | | | | | | | |
| Max. | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | | | | | | | |
| Max | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[3] | | | | | | | | | | | | | |
| % valid obs | | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010[5] | | | | 6.6 | 9.5 | 9.5 | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average[4] | | | | | | | | | | | | | |
| % valid obs | | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| 1981-2010[5] | | | | 30 | 38 | 36 | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[3]Snow water equivalent measured close to the end of the month listed. No data for 2012 HY.
[4]Cummulative snow depth measured close to the end of the month listed. No data for 2012 HY.
[5]Values cited are from National Water and Climate Data Center (current Jan. 22, 2013).


LACL SNCO FILA (Fishtrap Lake) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

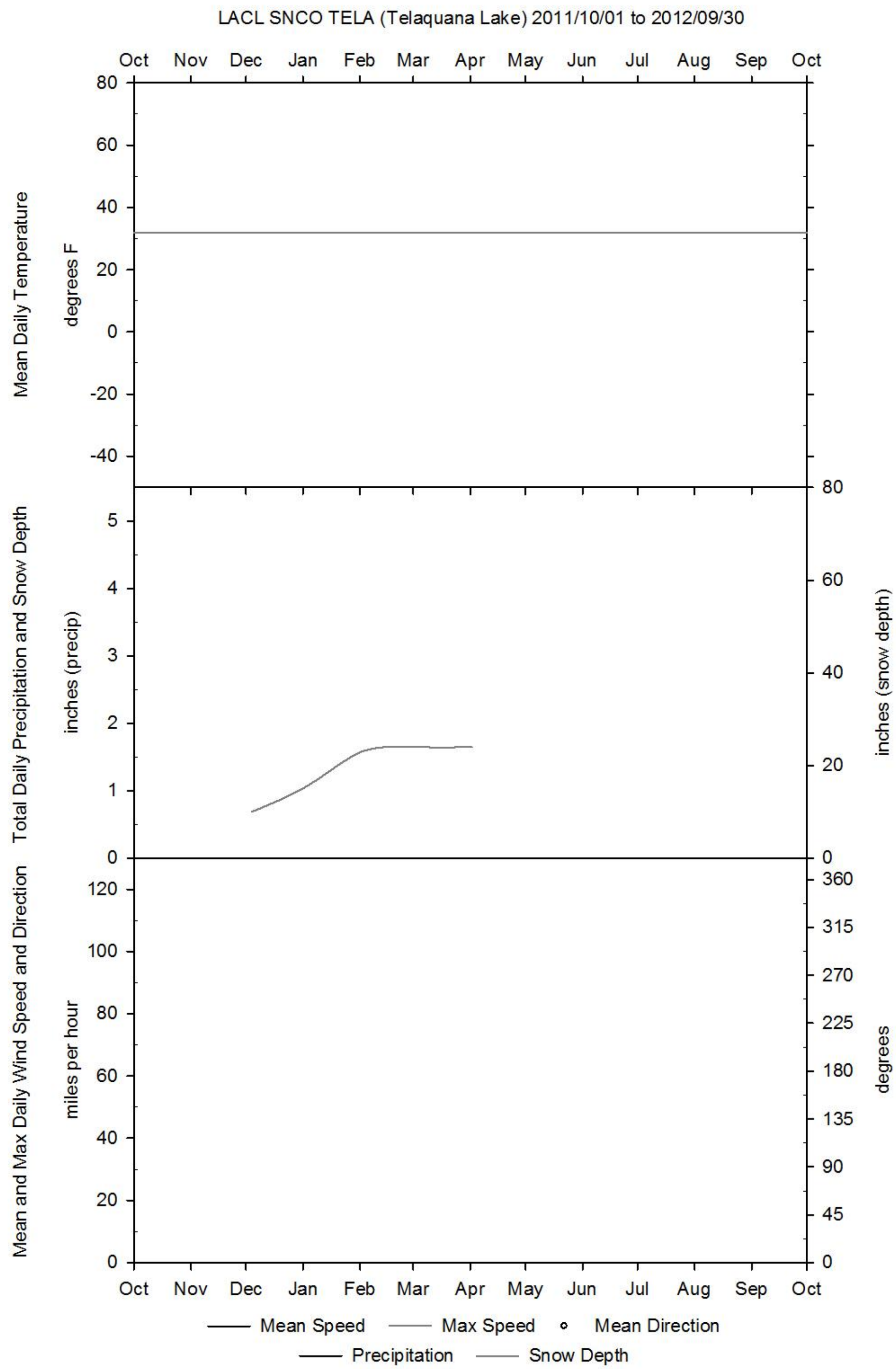
| 2012 Hydrologic Year - LACL SNCO POAL (Port Alsworth) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | | | | | | | |
| Max. | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | | | | | | | |
| Max | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[3] | | | | 5.5 | | 6.2 | | | | | | | |
| % valid obs | | 0 | 0 | 100 | 0 | 100 | 0 | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010[5] | | | | 3.1 | 3.6 | 3.3 | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average[4] | | | | 28 | | 25 | | | | | | | |
| % valid obs | | 0 | 0 | 100 | 0 | 100 | 0 | | | | | | |
| 1981-2010[5] | | | | 14 | 14 | 11 | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[3]Snow water equivalent measured close to the end of the month listed.
[4]Cummulative snow depth measured close to the end of the month listed.
[5]Values cited are from National Water and Climate Data Center (current Jan. 22, 2013).


LACL SNCO POAL (Port Alsworth) 2011/10/01 to 2012/09/30
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

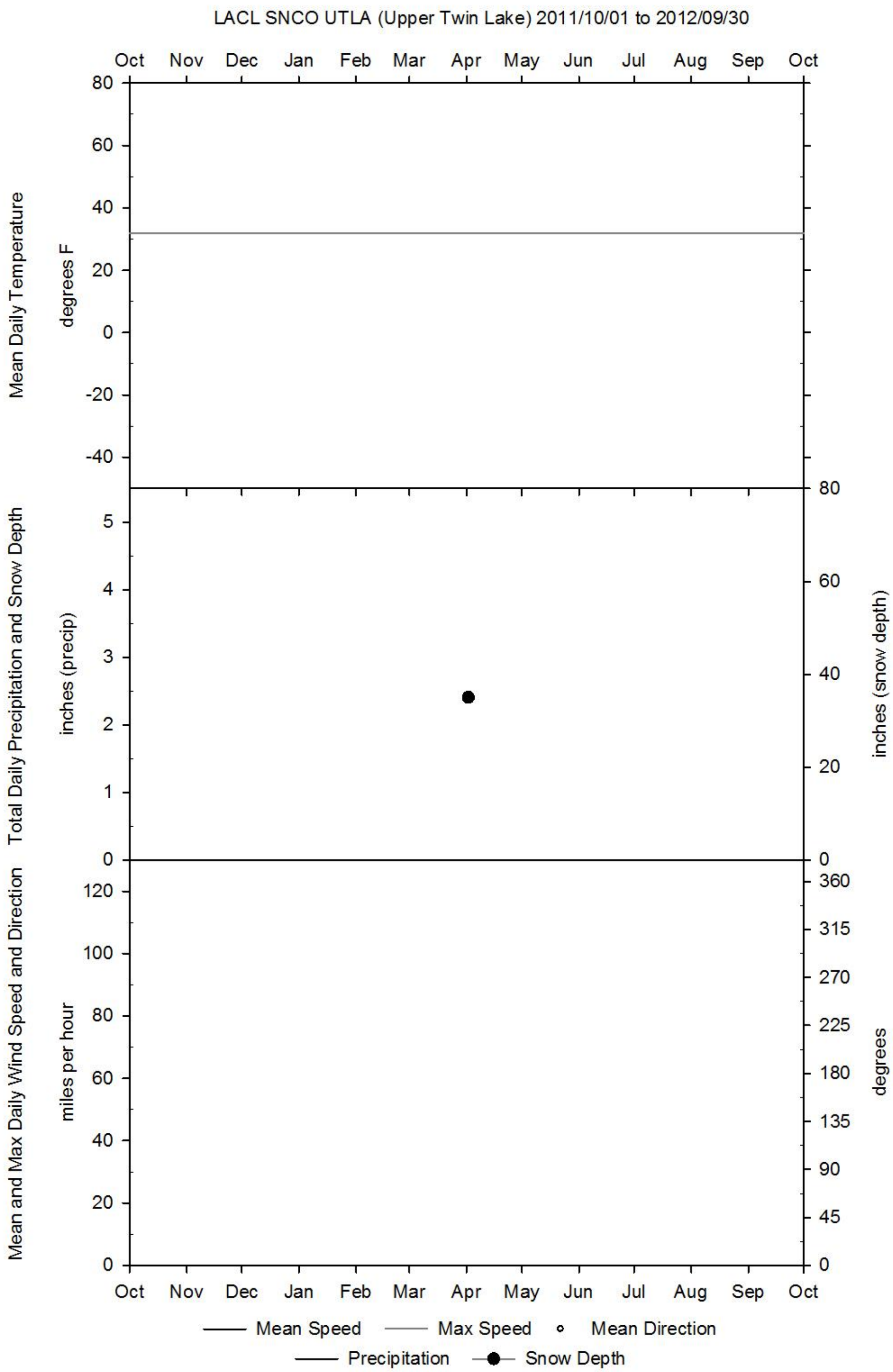
| 2012 Hydrologic Year - LACL SNCO TELA (Telaquana Lake) | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | | | | | | | |
| Max. | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | | | | | | | |
| Max | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[3] | | 1.9 | 2.8 | 3.5 | 4.5 | 5.2 | | | | | | | |
| % valid obs | | 100 | 100 | 100 | 100 | 100 | 0 | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010[5] | | | | 4.4 | 4.6 | | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average[4] | | 10 | 16 | 23 | 24 | 24 | | | | | | | |
| % valid obs | | 100 | 100 | 100 | 100 | 100 | 0 | | | | | | |
| 1981-2010[5] | | | | 20 | 19 | | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[3]Snow water equivalent measured close to the end of the month listed.
[4]Cummulative snow depth measured close to the end of the month listed.
[5]Values cited are from National Water and Climate Data Center (current Jan. 22, 2013).


LACL SNCO TELA (Telaquana Lake) 2011/10/01 to 2012/09/30
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Daily Temperature
degrees F
80
60
40
20
0
-20
-40
Total Daily Precipitation and Snow Depth
inches (precip)
5
4
3
2
1
0
inches (snow depth)
80
60
40
20
0
Mean and Max Daily Wind Speed and Direction
miles per hour
120
100
80
60
40
20
0
degrees
360
315
270
225
180
135
90
45
0
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

| 2012 Hydrologic Year - LACL SNCO UTLA (Upper Twin Lakes) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Year |
| **Minimum air temperature (F)** | | | | | | | | | | | | | |
| Min. | | | | | | | | | | | | | |
| Max. | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Maximum air temperature (F)** | | | | | | | | | | | | | |
| Min | | | | | | | | | | | | | |
| Max | | | | | | | | | | | | | |
| Mean | | | | | | | | | | | | | |
| # days <32 F | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| **Mean air temperature (F)** | | | | | | | | | | | | | |
| Observed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010 | | | | | | | | | | | | | |
| **Precipitation** | | | | | | | | | | | | | |
| Total[3] | | | | | | 8.8 | | | | | | | |
| % valid obs | | 0 | 0 | 0 | 0 | 100 | 0 | | | | | | |
| POR mean | | | | | | | | | | | | | |
| 1981-2010[5] | | | | | 6.4 | 6.8 | | | | | | | |
| **Snow depth (in)** | | | | | | | | | | | | | |
| Average[4] | | | | | | 35 | | | | | | | |
| % valid obs | | 0 | 0 | 0 | 0 | 100 | 0 | | | | | | |
| 1981-2010[5] | | | | | 25 | 26 | | | | | | | |
| **Wind (mph, degrees)** | | | | | | | | | | | | | |
| Mean speed | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |
| Max speed | | | | | | | | | | | | | |
| Max direction | | | | | | | | | | | | | |
| **Solar radiation (KWh/m2)** | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |
| % valid obs | | | | | | | | | | | | | |

[3]Snow water equivalent measured close to the end of the month listed.
[4]Cummulative snow depth measured close to the end of the month listed.
[5]Values cited are from National Water and Climate Data Center (current Jan. 22, 2013).


LACL SNCO UTLA (Upper Twin Lake) 2011/10/01 to 2012/09/30
Mean Daily Temperature
degrees F
Total Daily Precipitation and Snow Depth
inches (precip)
inches (snow depth)
Mean and Max Daily Wind Speed and Direction
miles per hour
degrees
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Mean Speed
Max Speed
Mean Direction
Precipitation
Snow Depth

NPS 953/120291, April 2013

**National Park Service**
**U.S. Department of the Interior**

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